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Twentieth Annual Conference
on
Educational Measurements

Held at Indiana University

April 14 and 15, 1933

Bureau of Coöperative Research, Indiana University School of Education

HENRY LESTER SMITH, Director

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Addresses by S. A. Courtis

DR. S. A. COURTIS, Professor of Education, University of Michigan, delivered three addresses at the conference, the subjects of which were "What the Classroom Teacher Can Learn from the Growth Curve," "The Use of Isochrons in Educational Research," and "A Demonstration Lesson in Individualized Instruction." These addresses were based on charts, which are not available for printing, therefore the addresses have not been included in the proceedings.

An Experiment in Measuring Changes in Pupil Attitudes Affected by Teaching

HOMER L. HUMKE, Head of Department of Education and Psychology, Evansville College

THIS study was begun in the fall of 1930 at Indiana University under the direction of Dr. Wendell Wright and Dr. Velorus Martz. The writer was ably assisted by Mr. Fred Anderson and Mrs. Merle Brown. Mr. Howard Alexander of the Evansville schools did much of the tabulating of data during the later stages of the study. It was the purpose of the committee to ascertain what attitudes were gained thru reading in the elementary schools. After extended study it was considered necessary: (1) to secure a list of the most vital attitudes needed for life; (2) to determine the best available methods of measuring these attitudes; and (3) to select reading material which could be used in teaching attitudes.

Before making the test a list of attitudes was secured from one hundred teachers. The list of attitudes selected included: clean-mindedness, dependability, honesty, coöperation, initiative, fairness, ambition, perseverance, good sportsmanship, and consideration. These were the ten highest checked from a list of thirty which had been submitted.

Available tests and measures of attitudes were studied carefully in an effort to find some material which would appear to fit into the purpose of the study. After careful consideration it was decided that for best results it would be necessary to construct a new test. Three forms were decided upon and produced for initial testing purposes. These were given to two or three hundred children. As a result of this preliminary experimentation, a test, later known as the I.U.E.C. Test, Series A, was developed.

Difficulty grew out of the fact that the committee had no index of the relative values of different books, stories, poems, etc., which might be used in teaching attitudes. The interests of children could be used only as a partial index of values. Of the material available, the Indiana state readers, *Good Reading*, seemed to contain the most material bearing on the selected attitudes.

In attempting to measure the changes in pupil attitudes affected by teaching it was decided to use pupils in Grades 5, 6, 7, and 8 in two schools of approximately equal social and intelligence levels. In one school, teachers were asked to give all possible emphasis to teaching attitudes. In a control school, teachers were asked to give no added emphasis to the teaching of attitudes. In cases where stories in *Good Reading* had already been taught, teachers were instructed to use material of a similar nature from supplementary readers. They were also asked to follow the plan of teaching outlined by W. W. Charters in *Teaching of Ideals*. His *Conduct Assignment* was used as a model,

altho there were undoubtedly many modifications of this assignment. This instruction was carried out very adequately during the period of experimentation. It was pointed out that the direct method could be abused and made offensive to children, and that overemphasis might seriously invalidate the results of this experiment. While reading was used as a vehicle for the teaching of attitudes it is likely that numerous approaches to attitudes were made in different subjects.

The Fulton School in Evansville, Indiana, was selected as a control school. The Howard Roosa School in Evansville was designated as the school where emphasis work was to be done. In January, 1931, about 300 pupils in each of these schools in Grades 5, 6, 7, and 8 took the test which had been developed. In April, 1931, children in these grades in the same schools repeated the test. After discarding incomplete papers and those with errors, 492 of the children were found to have written papers which could be used. Only 254 of the original children remained in the schools in December, 1932, at which time these pupils took a third test known as Series B.

In the preliminary stages of the study, it became apparent that a test of attitudes, to be of value, must include all the possible answers that children in the prospective group might offer to a given situation. The test offered a series of statements of possible reactions to a given situation and in addition gave children an opportunity, in cases where they did not accept any of the printed statements, to write their own reactions to the situation. One situation was developed for each of the ten attitudes selected and four possible reactions were offered for each situation.

In attempting to standardize the test, the total number of answers made by pupils to each reaction for the given situations was used to secure a rank evaluation. It is needless to say that answers were not evenly distributed among the different reactions. Some answers or reactions received few responses; others received many.

It was necessary to decide upon a definite number of points which was to be used as a basis for scoring these tests. For the sake of convenience, ten was chosen as the maximum score possible in any test. In arriving at scores for each of the situations it was found that on the above basis any reaction which had been checked by 75 pupils would be worth a score of one. A score of ten could not be received unless all of the pupils had marked the same reaction. It is evident that in this test there could be no regularity in range of values. In each situation there were responses which scored zero.

Another problem was the classification of all answers written in by the pupils. Written answers were arranged by classes and the number of pupils checked under each class was recorded. After appropriate values had been determined for the printed answers as well as for the classified written answers, each paper was scored.

On the basis of the valuation which was used, the best answers in the different situations were rated respectively. The total of all of the highest scores in the first five situations equals 38; in the second five situations the total is 36. Thus the highest possible score equals 74.

I. U. E. C. TESTS

Series A

Grade .....Age..... (Boy or Girl) .....Name.....
Last Birthday

City.....Teacher.....

Here are some stories that tell about things which happen to boys and girls. The answers tell what boys and girls do. You should tell what you would do. If one of the answers suits you, mark it with an (x). If none of the answers suits you then write your answer on the added line for each story.

In the sample story you would get something to eat so that is marked (x). But if you didn't like any of the answers you would write your answer on the line below.

Sample Story—
When I am hungry I:
( ) 1. Go to bed.
( ) 2. Take an auto ride.
(x) 3. Get something to eat.
( ) 4. Read a book.

I. If in playing a game I see that a point is made unfairly, I:
( ) 1. Let the point count.
( ) 2. Say nothing until someone else does.
( ) 3. Object later to counting it.
( ) 4. If we win tell an official.

II. If in making change a clerk gives me too much change, I:
( ) 1. Pretend not to see.
( ) 2. Use the money for a good cause.
( ) 3. Spend it for school supplies.
( ) 4. Boast about my good luck.

III. When someone tells a bad story, I:
( ) 1. Laugh at it.
( ) 2. Pass it on to my best friend.
( ) 3. Shame the one who tells.
( ) 4. Tell a story that I know.

IV. When I speak after a friend who has mispronounced a word, I:
( ) 1. Call attention to the mistake.
( ) 2. Omit the use of the word.
( ) 3. Pronounce the word like he did.
( ) 4. Refuse to recite.

V. When we go picnicking and eat along the road, I:
( ) 1. Leave the papers for the road cleaners.
( ) 2. Place them in a fence corner.
( ) 3. Let the wind blow them away.
( ) 4. Burn them by the roadside.

VI. If I have a chance to make a high grade by doing work on an extra drawing at home, I:
( ) 1. Am satisfied not to do any extra work.
( ) 2. Do the extra work carelessly.
( ) 3. Get someone who can do it better to make it for me.
( ) 4. Start playing and forget about the work.

VII. When my friends make fun of an old man who has fallen, I:
( ) 1. Join in the sport.
( ) 2. Shame my friends.
( ) 3. Look on but take no part.
( ) 4. Notify the police.

VIII. If my school club needs a new slogan or yell, I:
( ) 1. Hesitate to work out my ideas.
( ) 2. Let others make the effort.
( ) 3. Wait for the teacher to help.
( ) 4. See if I can find one to copy.

IX. If my father has a difficult task he wants me to do, I:
( ) 1. Excuse myself after one trial.
( ) 2. Tell my father I can't do it.
( ) 3. Get someone older to do it.
( ) 4. Do something more interesting.

X. If my teacher asks that a lesson be written for tomorrow, I:
( ) 1. Postpone the work as long as possible.
( ) 2. Get a friend's paper and copy.
( ) 3. Tell her I don't have time.
( ) 4. Get my mother to write it for me.

TABLE I. MEASURES OF DEVIATION AND CENTRAL TENDENCY (BOTH SCHOOLS, SERIES A, FIRST TEST)

	Grade 8	Grade 7	Grade 6	Grade 5	Composite
Mode interval*	64-66	58-60	64-66	52-54	64-66
Median or mid score	63	62	59	54	60
Q^3	68.84	66.84	66.47	62.87	66.68
Q^1	57.105	56.64	52.33	44.25	53.22
Q equals $\frac{Q^3-Q^1}{2}$	5.90	5.10	7.07	9.31	6.73
Mean	59.8	59.7	59.2	50.5	56.4
Highest score†	74	74	74	74	74
Lowest score	12	7	10	9	7
Range	62	67	64	65	67

* The interval used in this study was 3.

† The highest possible score was 74. Based on combined results of first and second tests.

The results present some interesting facts. In Table I it is seen that Grade 8 made the highest median score, likewise the highest mean score; however, the differences in medians of the three other grades are insignificant. But in both median and mean scores there is a gradual decrease from each grade to the one next lower. Range in scores is less in Grade 8 but here again the differences are insignificant.

Tables II and III give comparative data for the two schools. It is significant that in average increase or decrease per pupil Grade 5 made marked increase in the emphasis group while Grades 6 and 7 made slight increases in the emphasis group. In Grade 8 the loss and gain was reversed as to the two schools, the control group gaining, the emphasis group losing.

TABLE II. EMPHASIS GROUP—HOWARD ROOSA SCHOOL (COMPARING TESTS 1 AND 2, SERIES A)

	Grade 8	Grade 7	Grade 6	Grade 5	Total
Number increasing in second test	14	40	32	26	112
Number decreasing in second test	29	20	24	13	86
Number equal in both tests	9	7	2	1	19
Total in the group	52	67	58	40	217
Points increased*	90	284	344	452	1170
Points decreased*	257	201	326	129	913
Total increase or decrease†	−167	83	18	323	257
Average increase per pupil increasing	6.4	7.1	10.8	17.4	10.4
Average decrease per pupil decreasing	8.2	10.1	13.6	9.9	10.6
Average increase or decrease per pupil in class	−3.2	1.2	.3	8.1	1.2

* "Points increased" concerns only those pupils who increased their scores while "points decreased" refers only to those who decreased their scores.

† Difference between increase and decrease. Numbers without a sign are positive.

TABLE III. CONTROL GROUP—FULTON SCHOOL
(COMPARING TESTS 1 AND 2, SERIES A)

	Grade 8	Grade 7	Grade 6	Grade 5	Total
Number increasing in second test	82	35	33	36	136
Number decreasing in second test	22	27	27	33	109
Number equal in both tests	10	6	7	7	30
Total in group	64	68	67	76	275
Points increased*	376	274	324	400	1374
Points decreased*	182	295	353	299	1129
Total increase or decrease†	194	−21	−29	101	245
Average increase per pupil increasing	11.8	7.8	9.8	11.1	10.1
Average decrease per pupil decreasing	8.2	10.9	13.1	9.1	10.4
Average increase or decrease per pupil in class	33.0	−.3	−.4	1.3	.9

* "Points increased" concerns only those pupils who increased their scores while "points decreased" refers only to those who decreased their scores.

†Difference between increase and decrease. Numbers without a sign are positive.

The third test, Series B, was based upon the printed as well as the written answers of pupils. The printed reactions which had received only a light vote were dropped and the written reactions of pupils substituted. This final form included the six reactions to each situation. Those selected had received the largest number of votes.

TABLE IV. SCORES OF THOSE WHO TOOK BOTH SERIES A TESTS AND SERIES B*—BOTH SCHOOLS

	Grade 8	Grade 7	Composite
Mode interval	52-54	52-54	52-54
Median	52.07	52.73	52.14
Q^3	58.84	59.67	54.9
Q^1	51.00	49.88	45.9
$\frac{Q^3-Q^1}{2}$	3.92	4.89	4.5
Mean	54.6	52.7	51.3
Highest Score	74	65	74
Lowest Score	35	0	0
Range	39	65	74
Average increase per pupil increasing†	11.2	18.5	15.6
Average decrease per pupil decreasing†	10.39	8.27	9.85
Average increase or decrease per pupil in class†	−5.32	5.73	−1.31

* Of the original group only those were tested who had made normal progress and were found in Grades 7 and 8.

† Increases and decreases figured in comparing scores of Series A (second time) and scores of Series B.

Table IV indicates that on the test given in December, 1932, there was a decided drop of median and mean in both grades. In Grade 8 the range was decidedly less in Series B than it had been in Series A, but in Grade 7 it was almost the same.

Significant points of view may be presented as follows:

1. The test needs further study as to its reliability.
2. In checking for validity the writer recommends that the revision test be used in different schools under a variety of circumstances.
3. There is a reason to doubt the effectiveness of a test in which so many items present only one answer which has any scoring value such as existed in situations 2, 6, and 10. Less serious variations of this same problem exist in other situations in the test.
4. The means as indicated in Table I show a very close comparison in Grades 6, 7, and 8. We are not prepared to say whether the differences, namely, five-tenths between Grades 6 and 7 and one-tenth between Grades 7 and 8, are significant.
5. Some significance should be attached to the range indicated in Table I, since a wide range of scores is to be found in the lower grades.
6. Some significance should be attached to the number of students increasing and decreasing the test scores when the first and second tests are compared. We find significant increase in the fifth grade of the emphasis school, namely 323 points. However, we are unable to account for the loss of 167 points in the eighth grade in the emphasis school.
7. There seems to be very little difference, three-tenths of one point, in the average increase by the pupils in the two schools. This would seem to indicate that this particular conscious effort to teach attitudes has resulted in little as to score values.
8. We are unable to account for the fact that the eighth grade in the control school, with no conscious effort made to improve their score, made an average gain of 3 points, while the same grade in the emphasis school with a conscious effort on the part of the teachers to improve scores decreased an average of 3.2 points. However, in all other grades the gain in the emphasis group is greater than that in the control school. Especially was this true in Grade 5 which had in the emphasis group an average increase of 8.1 points as against an average increase of 1.3 points in the control school. The difference between Grade 5 in the two schools may not be explained easily. It is possible that in the fifth grade in the emphasis school the great increase may be due to greater efficiency of teaching. This is an assumption that cannot be proved with such small numbers. It merely points the way to possible further studies in this field.
9. It is interesting to note that in all grades the number of pupils increasing their scores is larger than the number decreasing, especially in the case of the eighth grade in the emphasis group.
10. The small average increase in the score of each school may be taken as an indication of the validity of the test, for it is understood that with conditions equal the results should be the same the second time the test was given.

The following deductions or conclusions seem to be justified:

1. If the significant increase in Grade 5 is an indication of possibilities, the work of teaching attitudes should be commenced early in school.

2. The wide range of scores in the lower grades would seem to indicate that attitudes of older children are more fixed and more in accord with accepted standards of conduct.

3. There is no appreciable correlation between the test scores and citizenship grades. For those who took Series B the correlation is .104. However, it is a safe assumption that the citizenship grades indicate no reliable mark as to attitudes. Perhaps an attitudes test grade should be substituted for the present subjective grades in citizenship.

4. It is safe to assume that not all teachers are equally capable of teaching attitudes. Comments from those who assisted the pupils in the emphasis group indicate that none of these teachers felt certain of their method of approach.

5. Judging from the results in this test it is doubtful whether we are yet prepared to teach attitudes successfully or to measure efficiently the results of such teaching.

A Study of Logical Learning in College Classes

ERNEST L. WELBORN, Professor of Education, Indiana State Teachers College, Terre Haute

FOR long ages the association theory of learning held sway in psychology. For Bain and his successors the view of learning as association of ideas was replaced by the doctrine of mechanical associations in the nervous system, and various laws pertaining to association were sufficient to account for the various phenomena of learning. As early as the 1890's, however, studies of logical memory, i.e., memory for meaning or substance, yielded results which could not be accounted for adequately in terms of associationism. Since that time logical memory has been attacked from numerous angles, and many important results have been obtained.

A perusal of the published studies suggests very strongly the inadequacy of the usual S-R bond explanations and diagrams of learning. I had occasion to examine more than a hundred such studies, which can be summarized as to their broad conclusions as follows: Alfred Binet, E. N. Henderson, and many others showed that retention of logical material is many times greater than that of rote material and that large units of meaning are remembered much better than details. H. E. Jones, Arthur Dietze, and many others demonstrated that forgetting of logical material occurs far less rapidly than that of rote material in the experiments of Ebbinghaus and others. Clark Wissler, May Smith, William McDougall, and many others obtained low correlations between memory for meaningful material and that for rote material. Studies showing the effect of factors other than association in logical memory include that of Laird, Remmers, and Peterson on the effect of organization, G. L. Freeman on context, and Cora B. Key on meaning and perceived relations. Other types of investigation might be mentioned also, but it would still remain true that logical memory has not been adequately investigated.

From the standpoint of efficiency in school learning, the experimental study of logical memory is important for at least two reasons: (1) It is much more apropos than experiments on rote memory, which have been the predominant type, because to a large extent, as Meumann has so well said in his *Psychology of Learning*, "our sole purpose is to learn the essential content of a coherent context or a mass of concrete material without regard to the author's wording." This is an apt description of much of the textbook study in school, and, accordingly, studies of the conditions of effective learning of such material have direct application to school practice. (2) The trend of results on logical

learning is such that the foundation principles underlying many practices in teaching school subjects are undermined and the basis for new and better methods is already available to a great extent.

It is my purpose this morning to present a brief review of an extensive experimental study of logical memory which I carried on for more than a year under the direction of Professor H. B. English at the Ohio State University. Doctoral dissertations are usually somewhat tedious, but I shall try to explain this one so simply and clearly that he who runs may read. Also, I shall especially emphasize whatever practical implications it possesses.

The principal purpose of the study was to compare two supposedly different sorts of learning, i.e., the exact verbatim form and the substance of written discourse, by the use of a reading and objective testing technique. Since our procedure seemed not to have been used previously in an experimental study of logical memory, it was believed that any definite trend that could be discovered would be important. This work was regarded as exploratory in nature, and no provision was made for investigating causal factors. Such factors may become the subject of later studies. Largely for the purpose of increasing the practical implications, several secondary variables, particularly systematic variations of spacing of readings, were introduced. This factor has received little attention heretofore in studies of logical memory.

One of the main tasks in our work was preparation of suitable reading material and tests. Many of the earlier studies employed narrative or descriptive passages and measured retention in terms of the number of words or ideas recalled. It is apparent that such alleged units are unsatisfactory because the words in a sentence are not independent units. Furthermore they are unequal in value and vary in characteristics favoring recall. In the present study, even tho untold time and labor were expended, it is conceded that the material was far from perfect. Still, there are several things to be said as to the good features. All of the passages were made up of abstract exposition on psychological topics, a type of material which seemed to be especially suitable. The tests were a form of the recognition type, composed of complete statements, which were to be marked as agreeing or disagreeing with the passage. A complete statement seems to be defensible as a unit in testing since it has unity and other attributes of a configuration. In all experiments two kinds of test items were given: verbatim reproductions of statements from the passage and statements of substance, the statements varying in scope in different experiments.

Groups of college students, mostly on the freshman or sophomore level, about 800 in all, were used as subjects; and the test records, numbering from 75 to 150 on each variable, totaled more than 2,500 in all experiments. The number of readings varied from one to four, and all subjects were tested with the two kinds of items.

The technique was such that it would be impossible to attribute the results to differences in material or anything else other than differences in the way the learners reacted to the task. Instructions and mode of presentation of material were uniform. Learners were not aware of

the real purpose of the experiments and of the difference in the test items. The two kinds of items were given to the same group or equally paired groups under identical conditions as to time, place, etc. Also the effects of differences in difficulty of passages and tests were neutralized.

Control group comparisons were made in all experiments. As controls, groups that had not read the passages were used. The comparisons of their scores with those of the experimental groups showed in nearly all cases only a small percentage of overlapping and were therefore interpreted as indicating that the experimental scores were to a very large extent due to the effect of reading.

The reliability of the tests was studied in various ways. The odd and even items were correlated in the case of groups of 100 or more scores, and the Pearson r's were then raised by the Spearman-Brown method for estimating the reliability coefficient of a test twice as long. In one series these coefficients were slightly below .70, and in the light of the usual standards for group comparisons (the only kind we made), they were considered acceptable in view of the fact that our comparisons were of rather large groups. In the other series the coefficients were slightly below and above .80, which is well above the minimum standard. The foregoing method does not indicate the reliability of individual items. A learner might change the marking of a large per cent of items in repeated tests and still have a score on a later test practically as high as the earlier score. We made a rough check on this matter. It was assumed that if an item was marked wrong the first time and right the next time, it was likely, tho not certain, that the learner guessed the second time. Such items were tabulated in a sampling of our data, and we found that this change occurred in the case of 5 to 11 per cent of the items in various tests. Therefore, it seems probable, tho not certain, that the guessing did not play a very large part in determining the score. Furthermore, the fact that scores were noticeably consistent in range and central tendency thruout tends to strengthen the evidence of their reliability.

In analyzing the results in the various experiments, we made our comparisons on the basis of medians of distributions and in many cases on the basis of means also, and the reliability of the median in terms of the probable error of the median was obtained thruout. The critical ratios of all differences in results were thus obtained and interpreted in terms of the number of chances in 100 that the true difference was greater than zero. The most important differences in our results were in most cases highly reliable.

A further method of comparison of results in the case of the contrasting sorts of learning was used. Following the procedure that many earlier studies have used, we correlated scores on pairs of like and pairs of unlike tests. A marked difference in the correlation in two such cases is usually interpreted as evidence of difference in the learning functions.

Paraphrase Series

Three articles, averaging 1,500 words in length, were used. Fifty verbatim items were prepared on each. The vocabulary of the passage

was used thruout, and the items were in every way as nearly perfect reproductions of material from the text as could be made. Then 50 paraphrase items were made by rewriting the verbatims, using a different vocabulary from that of the text, still preserving the general form of the statement in nearly all cases. However, certain important words were used in both kinds of items. The two lists were then divided in half and two test forms were made by combining 25 verbatims and 25 paraphrases in each case. Thus each verbatim in one form corresponded with a paraphrase in the other and vice versa. By way of illustration, I shall cite the following items from one pair of tests:

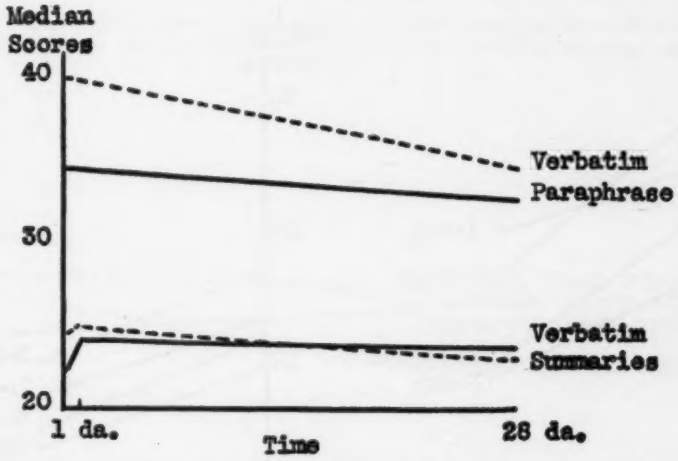

FIGURE I. COMPARISON OF RESULTS ON PARAPHRASE AND SUMMARY SERIES.

Verbatim: In the author's study the feeble-minded who were replaced in the community were under close supervision.

Paraphrase: In the present investigation the feeble-minded who were restored to their former environment were subjected to careful oversight.

Thruout the two tests there was an exact parallelism of the two kinds of items.

In each group four readings of a passage were given, and then half of the group took Form I, the other half Form II. All tests were repeated four weeks later. Spacings were varied among the groups, the principal spacings being the following:

Four consecutive readings.
Four readings at three-hour intervals.
Four readings at twenty-four hour intervals.
Four readings at three-day intervals.

Also a reducing schedule was tried, but was discarded owing to the fact that it showed no superiority over the other spacings.

Even tho the difference between the two tasks was certainly a narrow one, we succeeded in showing important differences. The general trend of the results is indicated by the two upper graphs of Figure I. In this series, without exception, the verbatims yielded higher scores than the paraphrases. The reliability of the differences in the immediate tests was certain in three out of four comparisons, while in the fourth, where the lowest reliability was to be expected, the difference had a reliability of 94 chances in 100. Even after four weeks, the differences in the results of the delayed tests had reliabilities ranging from

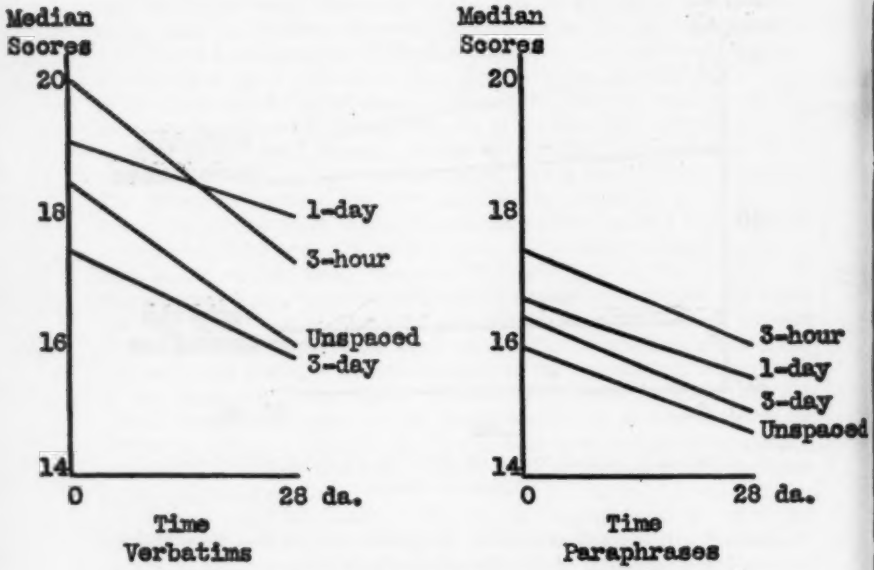

FIGURE II. COMPARISON OF SPACINGS OF READING.

90 to approximately 100 chances in 100. Also, it was found that thruout the series the loss of verbatim material was slightly greater than that of paraphrase material.

The comparative effect of the four spacings of reading is shown by Figure II. On immediate tests three-hour spacing gave the best results and one-day spacing the next best. On the delayed tests the results were the same, except that in case of verbatims daily spacing gave slightly better results than three-hour spacing. As between the better and poorer spacings, the verbatim differences were reliable in the immediate tests and fairly reliable in the delayed tests. The paraphrase differences were slightly less reliable throut than the verbatim differ-

ences. The outstanding facts are that spacing of from three to twenty-four hours gave better results than either extreme spacing, and that, so far as we know, these are the most reliable measurements of spacing in logical memory that have ever been made.

Minor studies in this series showed two interesting things. First, a test interpolated between the second and third reading had a beneficial effect on the final score. Second, in the case of subjects who read a passage one, two, three, or four times, there was a consistent increase in scores on both types of tests in relation to the number of readings.

Summary Series

Aside from certain minor points, the outstanding difference between this and the preceding series was a wider difference in the learning tasks

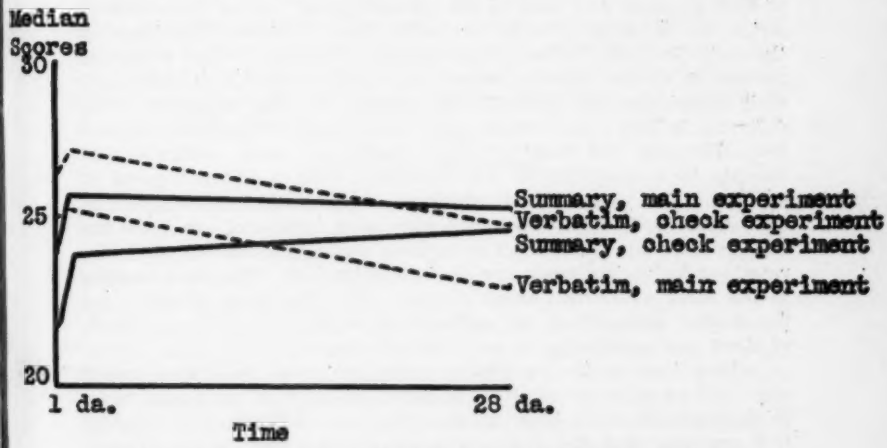

FIGURE III. COMPARISON OF MAIN AND CHECK EXPERIMENTS: SUMMARY SERIES.

tho the passages were lengthened and improved. The plan called for only one test on each passage. Each test was composed of 80 items. Fifty were verbatims of the same type as that in the preceding series. Twenty-five were like the former paraphrases in the use of a vocabulary different from that of the passage, but they differed in scope. They were really summaries or topic sentences covering sections of varying length in the passage. Also, five items not covered by the passage were included, solely to provide a third alternative in marking the items. The instructions were to mark each item as agreeing with the passage, not agreeing, not derived, or not remembered. A sample paragraph of material is the following:

"It is known that more pupils fail in arithmetic than in any other elementary subject and that arithmetic is one of the most serious sources

of non-promotion in the schools. Various school surveys are consistent in showing that the percentage of failures in arithmetic increases from grade to grade throughout the intermediate grades, but decreases in case of the other school subjects."

The summary based on the foregoing is: Investigations prove that the record made by arithmetic is less enviable than that of all the rest of the grade school curriculum.

Two readings of an article were given either consecutively or four days apart. Tests were given immediately after the second reading, twenty-four hours later, and four weeks later. All other variables were controlled.

The figures show the trend of the results. Figure I indicates that thruout the scores were somewhat lower than in the paraphrase series, a difference which was certainly due to the greater length and difficulty of both passages and tests in the present series. As in the preceding series, the verbatims gave better results than the contrasting items on the early tests, but in the present series at the end of four weeks the summaries showed practically no loss, while the verbatims lost their early superiority and fell below the summaries. The reliability of the difference in Test I was certain, while that of each of the later tests was low. However, the trend of these results has been confirmed just recently by a repetition of the experiment with a different group of subjects. The material and procedure were identical thruout, except that on the first day two readings were given instead of one, as in the main experiment. Thus there were three readings instead of two. The results of both experiments are given in Figure III. The extra reading in the check experiment seems to have raised the scores slightly, but the general character of the performance in the case of the two kinds of items was practically the same in both experiments.

Going back to the paraphrase series, we recall that there was a slight difference in the direction of better retention of the paraphrases. In the summary series, however, where the items differ from the original to a greater extent, the better retention of items less like the original stands out in much bolder relief. These differences can be attributed to no other cause than a difference in process in reacting to the two kinds of items.

Further evidence of differences in the summary series was obtained thru correlational analysis. With scores on pairs of like tests, i.e., pairs of summaries and pairs of verbatims, and pairs of unlike tests, a large number of correlations were calculated. One hundred cases were used for each correlation. The Pearson r's from like pairs ranged from .72 to .88, with a mean of .774; while those from unlike pairs ranged from .43 to .59, with a mean of .487. The difference in the two cases shows from another angle what has just been shown by the comparison of forgetting curves, i.e., that the subjects reacted very differently to the two kinds of items. This difference cannot be accounted for by any association theory of learning. Intimations from earlier studies have thus been verified by a somewhat different method of investigation, more directly to this point, and by more reliable measurements.

Another point of interest is that the tests twenty-four hours after reading yielded somewhat higher scores than the immediate tests in all cases. This phenomenon has been investigated and explained by Warner Brown. However, I have not found any other study of logical memory containing data on this point.

The present study affords no comparison of forgetting of logical and rote material, but the data are in harmony with those of other studies in showing that forgetting of logical material occurs very gradually.

Time does not suffice to present other phases of the work nor to review the first series, which, tho not so reliable as those discussed, yielded results showing even greater differences in the case of two more widely contrasting learning tasks.

Thus in three separate series important differences were found between scores on tests closely resembling the text and on tests somewhat unlike the original. The conditions were controlled to the greatest possible degree, and the measurements were more reliable than those in most of the earlier studies. The whole thing shows convincingly that there is a real difference in the learner's process in reacting to the contrasting tasks.

Practical Implications

Tho few in number, the practical implications of this study are important for several reasons. They are the result of a careful impartial study and hence are not open to the criticism that we proved what we set out to prove. Furthermore they are conservative deductions from a carefully analyzed mass of data.

First in importance is the practical implication of the main result of the study. Does this result afford any suggestion for the teacher? The type of teaching that stresses the taking in and recitation of textbook facts is all too prevalent. This type of work is often encouraged by the use of tests which emphasize specific details. Students frequently ask what type of test is to be given, so that they may review accordingly. Many recent studies of forgetting over long periods of subject-matter studied in school and college show a surprisingly small degree of retention. On the other hand, our study shows that retention is improved by repetition of material in a form differing from the original to even so slight a degree as a difference in vocabulary and to a greater degree when repetition is in terms of a greater difference from the original, as in the case of summarizing. It may be inferred, therefore, that the results of school work could be improved by putting more stress on teaching things meaningfully and especially by emphasizing the larger meanings. For the sake of memory alone, to say nothing of other more important results, "the teacher's first duty," as Reed has said, "is to make material meaningful."

Several points on testing technique are suggested. No great degree of reliability can be secured in objective tests without painstaking attention to details of statement. The influence of particular words and forms of phraseology is so subtle that slight differences in a statement

may alter the total effect. No teacher could be expected to do such painstaking work as we did in this investigation, but at least teachers might be more critical of the tests they use. I think a good rule would be to use the true-false type only in conjunction with other more acceptable types, and to exercise all possible care in preparing tests.

Also, tests should be carefully formulated from the standpoint of the particular type of achievement to be measured. It is sometimes asserted that a test of factual knowledge indirectly measures comprehension of larger meanings. Our results do not support this view, but instead show the special importance of tests specifically designed to cover the larger meanings.

The value of tests as teaching devices is suggested by our results on the effect of interpolated tests. Frequent tests might well be used for the purpose of facilitating learning.

There are two suggestions concerning reading. First, it is advantageous to read material several times, tho I do not wish to be construed as attempting to uphold the Law of Exercise, nor do I wish to imply that repeated reading is the best method of study. In the case of our material and procedure, each reading up to four added something to the test score, and it seems reasonable to assume that in many cases it would be desirable to read assigned material several times.

Second, our results suggest that spacing is a helpful factor in reading. We found that in some cases spaced reading gave results 12 per cent better than unspaced reading. Since this is true for material requiring ten minutes or less for a single reading, it is likely that it would be true to a greater degree for material of greater length. One should certainly expect better results if a long assignment were read only once at a sitting than if read more than once. Without going into detail, I wish to suggest that there are practical possibilities of adjusting assignments, study activities, etc., so as to make possible a moderate spacing of time devoted to a particular reading assignment. There is reason to believe that results would justify the effort.

Some Effects of Social Change on the Public Schools

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THE past half-century has been a period characterized by remarkable change along many social and economic fronts. Marked by extraordinary economic development accompanied by far-reaching changes in the basic social structure, the period has been truly an era of great events.

These developments have proceeded at an accelerating pace. Beginning with the industrial revolution of the eighteenth and nineteenth centuries, the processes of social and economic growth have gathered such momentum that the post-war generation has witnessed more significant changes in our social institutions than were confronted by several preceding generations. So rapid has been the development that its social consequences could hardly be anticipated, much less prepared for. The great improvements in the production of economic goods, such significant additions to our means of communication as the radio and automobile, the urbanization of the population with the attendant concentration of wealth in centers of commerce and industry, the emancipation of women, the growth of our educational institutions, the increased significance of international relations, the wide application of the scientific method of problem solving, and the increased tempo of modern life are only a few examples of modern social progress which have left countless unsolved problems in their wake.

Modern social evolution has not resulted in clear gain. Progress has not been uniform. The present economic depression, the growing stress in international affairs, the breakdown of democratic government in several sections of the world, the increase of crime, and the apparent inadequacy of our governmental machinery to cope with complex problems of social and economic life are evidence that much remains to be done to realize on the promises of recent social trends. Modern society has been subjected to such severe strains that the more pessimistic of our social philosophers have predicted the downfall of western civilization, in spite of the remarkable social progress of recent years.

The present economic depression has brought such pressing problems of school support that the attention of educators has been turned from the consideration of education in terms of a new social order to the more immediate problems of maintaining schools on greatly depreciated revenues. Much of the educational progress that was made during the years immediately preceding the depression has been lost because of inadequate school support. However, the lag of the public school program behind the societal procession was noted several years

before the depression and the return of prosperity will find us facing the necessity of readjusting the school to the demands of a society fundamentally different in many respects from the society of ten or fifteen years ago.

I wish to point out the effects on the public schools of a few of the more important social trends and to indicate some of the educational problems attendant to these social changes.

Social trends which have had significant influences on public education may be classified as those which have affected the organization and support of the schools and those which have affected educational programs and services. In the first group may be included the expansion of educational services; changes in the growth and distribution of the population; the concentration of wealth; and the centralization of governmental control. In the second group the mechanization of the processes of production; the increasing complexity of social and economic problems; the inertia of the institutions of social control; and the changes which have occurred in such fundamental institutions as the family, religion, and politics, should be considered. The list is not complete by any means. An exhaustive treatment of the effects of recent social trends in education would be far beyond the scope of this paper. Also many of the relationships are so complex and subtle that a vast amount of careful research would be necessary to understand them.

Undoubtedly one of the most significant of societal developments has occurred in the field of education itself. Enrollment in the public elementary and high schools increased from 15,503,110 in 1900 to 25,678,015 in 1930. The high school enrollment increased from 519,000 in 1900 to over 4,000,000 in 1930. In 1930 there were over 1,000,000 students enrolled in higher educational institutions of various types as compared to 285,000 in 1900. In 1930, 14 per cent of the persons of college age were in college, while in 1900 the percentage was less than three. Less than 10 per cent of the persons of high school age were in high school in 1900 while in 1930 over 50 per cent were enrolled. The total enrollment in all types of educational institutions in 1930 was approximately 30,000,000 and more than 1,000,000 teachers were required to staff the schools.

From 1900 to 1930 expenditures for public schools increased from approximately $215,000,000 to over $2,300,000,000 and the value of public school property increased from $550,000,000 to more than $6,200,000,000.

The tremendous growth in enrollment and physical facilities has been accompanied by a similar growth in the educational program. Nearly three times as many subjects are now offered in the secondary schools as were given in 1900. The number of elementary school subjects has increased nearly 50 per cent in the same period. In addition to the regular curriculum the modern school offers a variety of extra-curricular activities, greatly enriched content in many subjects, health services, guidance, and facilities for recreation during out-of-school hours. Special classes and schools for atypical children, vocational education, and adult education are important additions to the public

school program during the past thirty years. Kindergartens and nursery schools have found their way into many school systems during the period. The junior high school and the junior college with their characteristic offerings have been developed since the beginning of the century.

The improvement in teaching methods, the development of teaching materials, provisions for individual differences, the invention of measuring devices, the increasing efficiency of administration and supervisory procedures, and many other similar factors in a modern school program have been added so recently that most of us can remember their inception.

In addition to the elements of progress noted in previous paragraphs, the science and philosophy of American education are products of the twentieth century. The fundamental principles of education for democracy were stated by Dewey not more than thirty years ago. The first comprehensive treatment of educational psychology appeared about twenty years ago. Mental measurements and educational tests are even more recent. So rapid has been the development in the science and philosophy of education that there is hardly a textbook on education ten years old that is not out of date. Yet, in spite of their tremendous achievements, our educational philosophers and scientists have not been able to keep abreast the growing school system or the rapid evolution of society.

Several factors have been instrumental in the development of the American public school system. The American people have had unquestioning faith in the efficacy of education as a foundation for democratic institutions and as the instrument for developing the abilities and capacities of the individual. Increasing wealth and the improvements in the production of economic goods have released from economic enterprises the wealth necessary to the maintenance of a great public school system and the large numbers of persons engaged in education as learners and teachers. The fact that children and young people are no longer needed to assist in the production of the necessities and luxuries of life has made possible the tremendous increase in enrollment. New problems of vocational training and civic and cultural education have made necessary more extensive schooling for increasing numbers of pupils. The development of our public school system to its present status would be a challenging task in a static society: to readjust it continuously to new forms and conditions in society has taxed the ingenuity of educators and confused the minds of school patrons.

So accustomed have we become to the continuous increase in our school population that educators quite naturally expect the trend to continue and taxpayers are becoming alarmed at the demands of the public schools for increased facilities and greater budgets. Data from the national census of 1930 indicate, however, that enrollment in certain divisions of the public schools will soon reach a stationary level, if not actually decrease. The census of 1930 shows 128,240 fewer children under five years of age than were recorded in 1920. For the first time in any census year there were fewer children under five years of age than there were children 5 to 10 years of age. Since nearly all children of elementary school age are now in school, growth in elementary

school enrollment may be expected to remain practically stationary, if not actually to decrease. The declining birth rate may also be expected to affect high school enrollment unless the decrease in the number of persons of high school age is balanced by bringing a larger percentage into the school. Since hardly more than half of the pupils of high school age are now in school, it is quite possible that high school enrollment will continue to increase, altho at a declining rate. In Indiana, 85 per cent of the children 5 to 17 years of age were enrolled in school in 1930. It is apparent that the number of pupils to be cared for in the public schools of Indiana will increase very slowly in the future. In many communities the number may be expected to decrease. The single exception to this trend is the large increase in the number of post-graduate students in the high schools. This condition is due in large measure to the lack of employment. That it will continue in the future, if economic conditions improve, is questionable. No doubt many of these students would be in college if it were financially possible.

Approximately 40 per cent of the increase in school costs in Indiana from 1924 to 1931 was due to the growth in enrollment. Future demands on the public schools because of increasing enrollment in the elementary and high schools may be expected to be considerably less than in the past. School administrators will not have to face the problem of providing school facilities for rapidly growing school populations and it is reasonable to expect a gradual decrease in bonded debt. Since fixed charges due to debt obligations amount to 10 per cent or more of the school budget, the possible reduction in this item may be of some significance in school finance.

However, new demands on the public schools because of other social changes may more than balance the effects of the declining birth rate. Pre-school education, adult education, and the extension of the school period for teen-age pupils no doubt will continue to swell enrollments. The fact that substandard schools are found in large areas in all states indicates the need for continued expansion of the public school system, altho the rate of growth will decline.

Another trend in population growth should be noted. As the birth rate declines the percentage of adults in the population automatically increases. An increase in the proportion of producers in society may ease the burden of school support. Those areas in which a large percentage of the population are of school age have experienced greater difficulty in providing adequate education than the areas where the birth rate has been low.

The population movement from the rural areas to urban centers has been marked during the past decade. Urban population increased 14,600,000 from 1920 to 1930 while the farm population decreased 1,200,000. Altho the direction of the population movement has reversed during the depression, a return of industrial and commercial activity will, no doubt, cause a renewal of urban growth at the expense of the country. The problem of the rural schools is not one of providing for more pupils, but rather of increasing the quality of the educational program.

The latter point is of considerable significance. Pupils must be fitted for the more complex social environment of the city. Urban centers cannot afford to ignore the status of the rural schools, for many of the future residents of the cities will have been educated in the country schools. The relation of this problem to school support is obvious. The principle that school revenues should be secured where the wealth is located and pupils educated wherever they are is of as great importance to the city as it is to the country.

The increased mobility of the population indicates that education has ceased to be a local affair and must be considered on a state and national basis. Young's study of pupil migration in Indiana showed that only about one-fourth of the high school graduates remained in their home communities. Under such conditions the communities receiving these pupils should be concerned about their preparation for citizenship. The uneducated mountaineer from Kentucky and Tennessee who becomes a social problem in an industrial center of Indiana is evidence of the educational interdependence of states.

Coincident with the increase of urban population has been the concentration of wealth in commercial and industrial centers. Two hundred large corporations control nearly one-half of the corporate assets of the nation. One per cent of the population owns more than 50 per cent of the wealth of the nation, while three-fourths of the population own only about 5 per cent. During the period from 1921 to 1929 corporate assets increased nearly 38 per cent, while the value of all farm property decreased nearly one-third. One-fifth of the total retail sales are made by chain stores. Forty power companies produce nearly 90 per cent of the electrical energy of the country. Over 30 per cent of all bank loans and investments of the nation are controlled by 288 banking concerns. These examples of the concentration of wealth and income may be multiplied many times.

The mal-distribution of wealth and the change in sources of income are basic to our current problem of school support. Wealthy communities are able to support excellent schools on relatively low tax rates, while the poorer communities can provide only the most meager of educational opportunities under a crushing burden of taxation.

The major problems of school finance are not products of the depression. The inability of many communities to support an extensive public school system became evident thirty years ago. The concentration of wealth and income has increased educational inequalities. The breakdown of obsolete systems of taxation based almost entirely on real property can be attributed *in toto* to the change in forms of wealth. It is imperative that school officials turn to new sources of revenue if education is to meet the responsibilities put upon it. Altho the means of support may be localized, the need for education is universal. In the past ten years several states have developed new methods of school support and it is only a matter of time until the localities must be relieved of a large portion of school taxes and the burden transferred to the state or nation. Until this is accomplished the public schools of large areas will languish.

The tremendous change in our social structure and economic organization has been accompanied by greater centralization of social control. Social and economic problems have ceased to be mere local affairs, consequently state and national governments have been forced to assume controls that formerly were exercised by local units or by individuals. The current clash between individualism and socialized control is a product of this trend.

The public school has not escaped the tendency to centralize control. State departments have broadened the scope of their authority and legislatures have enacted many forms of state control into law. The local community can no longer pursue its own way in educational affairs. Neither can the parent determine the education of his child.

The seeming paradox with which we are faced is the need for strengthening and expanding central agencies of control and the necessity for preserving those elements of local initiative which have been instrumental in the development of outstanding local school systems. The small school district is the stumbling-block to many educational reforms. Education fitted to the needs of pupils preparing to participate in a modern society cannot be provided in the small school except at excessive cost. Administration and supervision remains inefficient and inadequate in the small units. On the other hand, many state departments of public instruction are unable to cope with the added responsibilities of the state for education.

Little has been accomplished to date in enlarging local school units. Recent developments in Missouri and Utah point the way for other states in this type of centralization. Delaware has instituted complete state control of public education and North Carolina has practically centralized the financial administration of the six-months' term. The outcome of these experiments should be considered very carefully.

The professionalization of state departments of education has been accomplished in only a few states. The majority of these offices are still considered the legitimate spoils of politicians. Likewise, few of these departments have been expanded to the point where they are capable of administering the educational affairs of the state.

There is need for careful definition of the respective functions of the state and federal governments and the localities in public education. Recent studies of the relation of the federal government to education and of state support for public schools are significant contributions in this field. The development of adequate forms of school organization and control are still problems for the future.

Of the various social changes which have significant influences on the services and programs of the public schools, the mechanization of the processes of production are the most important. The combined physical output of industry and agriculture increased 34 per cent from 1922 to 1929. In this period, productivity per worker in manufacturing increased 22 per cent and in agriculture productivity per worker increased approximately 16 per cent. The large gain in productivity per worker not only has swollen the stream of wealth but has released a large percentage of the population for nonproductive services. The

efficiency of our economic processes has made possible the enforcement of child labor and compulsory school attendance laws.

Greater leisure and technological unemployment are two of the permanent products of our economic system. Education for leisure is a new objective of the public school which is requiring considerable attention in curriculum construction. More leisure for the worker has increased the possibilities of adult education. Technological unemployment with the necessary occupational shifts has complicated vocational education. The problem now seems to be to make pupils more adaptive to changing vocations rather than to train them for specific occupations which are likely to disappear in a short time. The re-education of the technologically unemployed is becoming a major objective of adult education.

In the past education has been concerned primarily with increasing the productive capacity of the individual. That this type of education has been highly successful is indicated by the increased efficiency of the economic system. So far the problem of the proper distribution of the fruits of industry has not been given serious consideration in our public schools. There is also need for consumption education. The bewildering array of goods confronting the modern shopper, with all of the subtle devices of advertising to lure him on, has no doubt hindered the realization of the maximum human welfare from consumption. Some progress has been made along this line in domestic science, manual arts, and fine arts. More is needed. It is quite possible that greater human welfare might result from teaching pupils to read intelligently the advertising sections of the *Saturday Evening Post* and to interpret correctly the propaganda broadcast daily over the radio than it is to teach them many of the traditional subjects. Fortunately it is possible to do both.

Along with the improvement in processes of production there has been a remarkable extension of the means of communication. The radio, automobile, and movie, and the wider diffusion of printed matter are only a few of the methods of communication that have provided new forms of extra-school education. Social horizons are broadened and social contacts are increased thru these media. The program of the public school has already been adapted to the use of modern methods of social contact, e.g., the radio and the movie. The advantages of travel are being incorporated into the public school curriculum, especially in higher educational institutions. However, the influence of the radio, movie, and automobile have not been desirable in all respects. Much of the education received from these sources runs counter to the fundamental objectives of the school. The influences of these activities on education for citizenship, leisure, and character can only be estimated. Unquestionably a number of unsolved problems exist. The ultimate effect of improved means of communication on teaching method, curricula, and school organization can hardly be anticipated at the present time.

Recent progress in technology has precipitated numerous social problems. Quoting from the findings of the Committee on Social Trends:

"With these events have come national problems urgently demanding attention on many fronts. Even a casual glance at some of these points of tension in our national life reveals a wide range of puzzling questions. Imperialism, peace or war, international relations, urbanism, trusts and mergers, crime and its prevention, taxation, social insurance, the plight of agriculture, foreign and domestic markets, governmental regulation of commerce and industry, shifting moral standards, new leadership in business and government, the status of womankind, labor, child training, mental hygiene, the future of democracy and capitalism, the reorganization of governmental units, the use of leisure time, better home and standards of living all of these and many others . . . demand attention if we are not to drift into zones of danger. . . . Of the great social organizations, two, the economic and the governmental, are growing at a rapid rate, while two other historic organizations, the church and the family, have declined in social significance although not in human values. . . . Of these four great social institutions, the economic organization, at least, has progressively adjusted to mechanical invention . . . but there are many adjustments to be made within other parts of the economic organization. . . . Another focus of maladjustment has its center in our ideas of property, the distribution of wealth and poverty—new forms of age old problems.

"The shifting of economic activities has brought innumerable problems to government. It has forced an expansion of governmental functions creating problems of bureaucracy and inefficiency. . . .

"Like government the family has been slow to change in strengthening its services to its members to meet new conditions forced upon them. . . .

"The spiritual values of life are among the most profound of those affected by developments in technology and organization. They are the slowest to change to meet altered conditions. Moral guidance is peculiarly difficult when the future is markedly different from the past. So we have the anomalies of prohibition and easy divorce, strict censorship and risqué plays and literature; scientific research and laws forbidding the teaching of evolution; contraceptive information legally outlawed but widely utilized. All these are illustrations of varying rates of change and their effect in raising problems."

The present economic depression is tragic evidence of the confusion and disorganization existing in our social structure.

If public education is to play its expected rôle in social reconstruction many adjustments are necessary. Educators will have to become students of economics and sociology. The philosophy and science of education will shift to new emphases. The social sciences will become the core of the curriculum. The school may expect to continue to assume functions that formerly were exercised by other social agencies. The public school system must continue to grow in importance and the future measures of its achievement will not be those pertaining to physical facilities and financial expenditures but rather those pertaining to its social effectiveness.

Making Pupils' Marks in Physical Education More Objective

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IT is not expected that teachers of physical education will be present in any numbers to hear this discussion. The principals and superintendents of these teachers are here and can carry back to their teachers these mimeographed instructions and the explanations made at this time.

This material should not be judged upon the basis of a piece of scientific research but more as a practical attack, in the actual teaching situation, upon a problem which we physical education teachers have as a rule found great difficulty in solving. It is an attempt to prevent marking pupils upon the basis of attendance alone or perhaps upon attendance and the estimates of a teacher as to the work of some three or four hundred pupils, made at the teacher's home on the night before marks are due.

Physical education is an activity program, part of the educational program, and based upon three educational objectives, namely: (1) health, (2) worthy use of leisure time, (3) ethical character. These three objectives are attained thru a fourfold development: (1) organic development—meaning physical soundness; (2) neuromuscular development—meaning the health, safety, and recreational skills; (3) interpretive cortical development—meaning the judgments, knowledges, and insights; (4) emotional impulsive development—meaning the attitudes, volitional controls, and ideals primarily of a social nature.

A pupil's mark is a symbol representing his progress towards this fourfold development. To be truly representative a mark must be based upon measures which are valid, reliable, and objective. The following marking system is the result of over ten years of experimentation and experience in marking over 5,000 pupils in junior or senior high schools.

The weighting of the factors considered in Chart I is a result of constant attention to the effects of the various weightings upon the total distribution of marks at the end of several semesters. The factors used are an attempt to make a practical yet representative sampling of the total outcomes of the program. No attempt shall be made to validate this system or to prove its reliability. Instead it will be the purpose of the following material to present a more objective basis for marking than has, unfortunately, been the custom in the past. It might be of interest to note the effects of such a marking scheme as the one here presented. A tabulation of marks given to over 1,000 pupils by this method, with a few minor changes, are as follows:

A's—7 per cent, B's—50 per cent, C's—38 per cent, D's—3 per cent, E's—3 per cent.

This is not a normal distribution but that might be explained by the fact that it is the aim of the program in physical education to raise the majority of the pupils *above* the average and in many instances nearly perfection might be expected.

Chart II is a device for combining the marks received in the several factors, with their varying values and weights, into a final mark by adding the point equivalents of those marks. For example:

A student receives a semester mark of B in attendance	18 points
He receives an A in meeting administrative requirements	4 points
Two hygiene inspections were marked A, one B (8 + 3)	11 points
Two posture tests were B, one was A (6 + 4)	10 points
Three new type examinations each were marked A	12 points
Three citizenship estimates were A (3 x 8)	24 points
Total points earned during the semester	79 points

Referring to Chart II it is seen that 79 points lies in the class interval 97 to 70, which interval corresponds to a mark of B. This is the pupil's mark for the semester.

Charts III to VII inclusive indicate the manner in which the marks for the several factors of Chart I may be obtained and in most cases will be self-explanatory. Referring specifically to Chart III one might say that a pupil's attendance is certainly not a measure of his progress in the fourfold development. No, but it does measure to what extent he has been given an opportunity to participate in the activity, and roughly, how interested he is in the program. Physical education being activity of a total body type, it is not possible to "read up on the assignment" and thus make up the deficiency. He must actually get in the physical and social situations.

Charts IVa and IVb are suggested means of distributing marks for certain performances in the self-testing phase of the program. Before marks can be given fairly for such performances it is necessary that pupils be classified according to their motor power or ability. An inexpensive, easily administered, statistically sound device for doing this is suggested by C. H. McCloy in his *Measuring Athletic Power*. Briefly, his system is to classify as follows: "20 x age to nearest half-year, plus 6 x height to last full inch, plus the weight in pounds will give the pupil's index number." Norms are suggested for classifying by means of these index numbers. The normal distribution method is simpler to administer but is not quite as reliable as with the use of the standard deviation technique. *Teachers' Marks and the Marking System*, a University of Iowa Extension Bulletin, will give briefly and clearly how this may be found.

CHART I. FACTORS TO BE CONSIDERED IN MARKING PUPILS, WITH WEIGHTED VALUES IN TERMS OF NUMBER OF POINTS FOR ASSIGNED MARKS

Factor	A	B	C	D	E	Remarks
Attendance	24	18	12	6	0	(Given once)
Skill in decathlon and stunts tests	24	18	12	6	0	(Given once)
Towel fee, uniform, lock requirements	4	3	2	1	0	(Given once)
Hygiene inspections	4	3	2	1	0	(Given 3 times)
Posture tests	4	3	2	1	0	(Given 3 times)
New type tests on rules, etc.	4	3	2	1	0	(Given 3 times)
Teachers' estimates (citizenship)	8	6	4	2	0	(Given 3 times)
Total possible for each mark	112	84	56	28	0	

CHART II. A SYSTEM FOR ASSIGNING FINAL MARKS ON THE BASIS OF TOTAL NUMBER OF POINTS EARNED BY VARIOUS MARKS AS INDICATED IN CHART I

Total Points	Mark
From 112 to 98, inclusive	A*
From 97 to 70, inclusive	B
From 69 to 41, inclusive	C
From 40 to 14, inclusive	D
From 13 to less, inclusive	E

* If the school requires a numerical mark, then the following values may be given: A = 97, B = 90, C = 81, D = 73, E = 60.

CHART III. A SYSTEM FOR ASSIGNING FINAL MARKS FOR CLASS ATTENDANCE*

Days Absent	Mark
From 0 to 1, inclusive	A
From 1+ to 2, inclusive	B
From 2+ to 5, inclusive	C
From 5+ to 9, inclusive	D
9+ or more	E
More than 12 days absences, when not excused or made up, *fail* regardless	

* Unprepared days shall count as absences. Three tardinesses shall constitute one absence. Up to 12 such absences or computed absences may be made up by additional attendance in other sections.

CHART IV (a and b). SUGGESTED METHODS FOR DETERMINING MARKS FOR PERFORMANCES IN STUNTS OR DECATHLON TESTS*

Distribution	Mark
(a) ACCORDING TO THE NORMAL DISTRIBUTION CURVE	
Upper 7 per cent in achievement in respective grade or class	A
Next 24 per cent	B
Next 38 per cent	C
Next 24 per cent	D
Lowest 7 per cent	E
(b) ACCORDING TO THE STANDARD DEVIATION TECHNIQUE	
Above 1.8 standard deviations from the average	A
Below 1.8 S.D. and up to .6 S.D. above the average	B
Between + and − .6 S.D. from the average	C
Less than −.6 S.D. but not less than −1.8 S.D. below average	D
Below −1.8 S.D. below the average	E

* In assigning a mark for meeting administrative requirements promptly, the full value for that duty may be given if the requirements are met within one week after the first class meeting. For each succeeding week the mark may drop one level until four such weeks, at which the pupil should receive "E." However, steps must be taken to assure that the pupils meet the requirements in spite of the fact that they have failed to be prompt. It would be feasible to continue by subtracting from other points earned until the pupil has lost as many points as it would have been possible for him to have earned thru prompt compliance with the requests, namely four points.

CHART V. ASSIGNING MARKS FOR EACH HYGIENE INSPECTION

The instructor might hold a small card in the hand as he inspects. On that card could be some such a scheme as follows. This would make for greater objectivity in marking entire classes.

Points given		Equivalent marks	
Clean face	1 point	Score of 12 to 13	A
Clean neck	1 point	Score of 9 to 11	B
Clean shirt	2 points	Score of 6 to 8	C
Name on shirt	1 point	Score of 4 to 5	D
Clean hands and arms	1 point	Score of 3 or less	E
Clean trunks	2 points		
Name on trunks	1 point		
Clean knees	1 point		
Clean feet	1 point		
Name on both shoes	2 points		
Total possible	13 points		

CHART VI. SCHEME FOR ASSIGNING MARKS IN TRIPLE POSTURE TEST*

Standard	Mark
Pupil remains in thruout entire test	A
Pupil sent back on final exercises only	B
Pupil not sent back until marching test	C
Pupil sent back on the standing test	D
Pupil fails to take the test because of absence	E

* On the New Type Examinations over rules and other desirable knowledge of the program the same procedure should be followed as in other educational tests. The tests should be sufficiently short to permit their being administered in not over ten minutes.

CHART VII. A SYSTEM FOR MAKING THE TEACHER'S ESTIMATES OF THE CHARACTER AND CITIZENSHIP ACHIEVEMENT OF THE PUPILS MORE OBJECTIVE*

An "A" pupil in physical education

1. Shows initiative in doing things beneficial to the class.
2. Is a natural leader among the boys and interested in the program.
3. Rarely if ever neglects duties or responsibilities.
4. Is exceptionally skillful in the games, stunts, and other exercises.
5. Is courteous, pleasant, and a definite help to the class.
6. Is thoroly reliable and trustworthy.

A "B" pupil in physical education

1. Will follow directions faithfully but does not see of his own accord.
2. Can be used as a squad leader. Willing.
3. Occasionally forgets duties. Slow in meeting requirements at times.
4. Better than average skills in most of the activities.
5. Is courteous and pleasant, in no way detracts from the class.

A "C" pupil in physical education

1. Is careless in meeting requirements. Must be followed up frequently.
2. Can't lead but usually will follow a leader.
3. Frequently forgets, is slow in response, frequently inattentive.
4. Has fair skill, doesn't know rules well.
5. Is thoughtlessly discourteous at times, takes up class time, but not purposefully.

A "D" pupil in physical education

1. Evades the activities (showers). Must be watched always.
2. Doesn't conform. Frequently disobeys leaders.

3. Dislikes the work. Does as little as possible.
4. Lacks skills and won't use the few that he has.
5. Is selfish, discourteous, a smart aleck.
6. Is a definite detriment of the class.

An "E" pupil in physical education

1. Lies out of or refuses to participate in the activities.
2. Is dishonest in matters of fact and property.
3. Is insubordinate. Willfully disobeys.
4. Always requires extra time or attention.
5. Is a disturbingly harmful element in the class.
6. Shows practically no skills.

* Select two of the most reliable leaders in the class. Furnish them with the standard which follows. In addition cause them to select the best pupil in the class and the poorest pupil in the class and rate these two pupils by the standard. The pupils will now be caused to step before the teacher and two leaders and be rated in accordance with: (*a*) the standard below, (*b*) the two students previously selected, and (*c*) a pupil to pupil rating as they stand in line, five at a time.

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Comparison of Two Methods of Measuring the High School

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Introduction

HISTORICALLY, the high school has been measured in terms of the educational machinery involved.[1] The school building and grounds, the teaching staff, the curriculum, the administrative policies and practices, and most of the other more or less tangible, external aspects of the school have, at one time or another and in different combinations, been used as bases of evaluation. The use of arbitrarily defined standards as criteria of the different aspects of the educational machinery has been the common practice. Invoicing and accounting has been the usual procedure.

This method—which I shall refer to as the traditional method or the method of the arbitrarily defined standard—is still the most widely used method of measuring the high school. Ultra-conservative school men tend to consider it as almost if not quite inviolable; and school men in general tend to respect it as a very satisfactory, if not the most satisfactory, method available.

But, latterly, a radically different method of measurement has been introduced—a method by means of which the high school is measured in terms of what it accomplished educationally.[2] The knowledges, habits, skills, interests, attitudes, and the other broader social patterns such as ideals, personality, and character, as developed or influenced in the students by the school—in short the educational outcomes—are used as bases of measurement. Objective educational tests including scholastic achievement tests, interest questionnaires, attitude scales, rating devices, etc., are used as criteria of the outcomes. The results obtained are evaluated statistically.

This new method—which I shall choose to call the "scientific" method or the method of the objective educational test—is so new that, as yet, it has relatively very few supporters. As a matter of fact it is hardly

[1] See: administrative handbooks of most state and regional accrediting agencies; "Estimating State School Efficiency." *Research Bulletin*, N.E.A., Vol. 10, No. 3, 1932. pp. 77-131.

[2] See: Capen, S. P. "Vital Educational Measures Applicable to College." *Bulletin of the Association of American Colleges*, No. 19, 1932. pp. 45-53; "Report of the Committee on Revision of Standards." *The North Central Association Quarterly* 7:185-205, September, 1932; Jessup, W. A. "Standardization and Achievement." *The Educational Record* 13:112-20, April, 1932; Trimble, O. C. and Remmers, H. H. "Measures of Educational Outcomes *versus* Standards of Institutional Machinery as High School Accrediting Criteria." *Studies in Higher Education, XXII: Bulletin of Purdue University* 33:1-37, March, 1933.

well enough developed to be generally acceptable. Criteria for all of the educational outcomes are not yet available; and even many of the criteria that are available for the outcomes considered measurable at the present time are not entirely satisfactory. But, even so, this method seems to be growing in the graces of progressive and would-be progressive school men, some of whom take the position that it is even now a more adequate method of measurement than the traditional method.

Now the question is—prejudices, sentiments, and opinions to the contrary notwithstanding—"What are the relative scientific merits and demerits of these two methods of measuring the high school?" or "Which of the two methods conforms more nearly to the requirements of science?"

Admittedly, this question is difficult for me to consider. It is difficult for me to get beyond the realm of mere opinion and perhaps a certain amount of prejudice; and, besides, the facts involved seem to be very elusive. But, if I may—I do not mean to be at all patronizing—I should much prefer to be relieved of the task. As a matter of fact, in considering my competency in this connection, I almost despaired of the task. But, finally, I came to much the same conclusion that the Irishman who had sworn off drinking intoxicants came to when not altogether by chance he found himself standing before a bar with a foaming mug of beer within easy reach. (Imagine his predicament!) His conclusion was, in his own words, "There may be ten thousand reasons why I shouldn't take a drink, but for the life of me I can't think of a single one." So say I! I mean that in the last analysis I could find no reasonable excuse for desisting—I will try to answer the question before us. But I do not expect to settle this question either as summarily or as satisfactorily as the Irishman of the story doubtless "settled" his beer. Rather, I only hope that I may succeed in stimulating further research bearing on these and perhaps other methods of measuring the high school.

By way of indicating the relative merits and demerits of the two methods under consideration, I propose to show, by comparison, (1) the relative validity of institutional machinery and educational outcomes as bases of measurement, (2) the relative validity and reliability of arbitrarily defined standards and objective educational tests as instruments of measurement, and (3) the relative soundness of invoicing and accounting procedures and statistical procedures as procedures in the measurement of the high school. In order to emphasize the differences thus indicated, I shall offer some illustrative cases based on research. Finally, I shall state my position on the question of the relative merits of the two methods.

Institutional Machinery versus Educational Outcomes as Criteria of the High School

It has been pointed out already that the use of the method of the arbitrarily defined standard in the measurement of the high school involves the utilization of at least certain aspects of the machinery of the school as the basis of the evaluation, and that the use of the method of the objective educational test involves the utilization of at least certain particular educational outcomes as the basis of the measurement. Consideration of the validity of the bases of measurement involved should

therefore throw some, perhaps considerable, light on the relative merits and demerits of the two methods.

The first question for consideration in this connection is: Can a social institution such as the high school be measured directly and adequately in terms of itself, or must it necessarily be measured in terms of its functions? That is, can the high school be measured in terms of what it is or must it be measured in terms of what it does?

The answer to this question is not far to seek. It all depends on the purpose of the measurement. If knowledge of what constitutes the school in and of itself be all that is desired, it not only can but should be measured in terms of the elements of which it is composed. Determination of the type, kind, and amount of the different elements of the school machinery involved, i.e., the school building and grounds, the curriculum, the teaching staff, etc., would constitute the measurement, and the values thus derived would constitute the bases in terms of which the school could be described. But who would be interested in measuring the high school apart from its functions? Certainly no school man would be so interested.

On the other hand, if knowledge of the efficiency or success of the school—apart from the institutional machinery involved—be desired, it must necessarily be measured in terms of its functions. Determination of the extent to which the school contributes to the knowledges, skills, habits, interests, attitudes, and the other cultural and social patterns appropriate to the high school age would constitute the measurement, and the values thus derived would constitute the bases in terms of which the school could be evaluated.

On this last point, Chancellor Capen,[3] of the University of Buffalo, in a discussion of the question of the measurement of the college—which question is not essentially different from the one under consideration here—has the following to say:

"Its (the school's) success can be gauged only with reference to its purpose. I should like to stress this point. The confusion and much of the bitterness that have followed the attempts to measure institutions are due to the fact that the point is commonly ignored. Let me restate it. The success of a social institution—even that small modicum of success that justifies the institution's continued existence—can be estimated only in relation to its purpose. If the individual associated with an institution derive from the association secondary benefits aside from the purpose, that may constitute a gain both for the individual and for society, but it has no bearing on the success of that institution."

President Jessup[4] of the State University of Iowa takes much the same position, that is, if I understand his position. So does President Zook[5] of the University of Akron, I believe, altho he is not certain about the kind of criteria to be used. So, also, does the Research Division of the National Education Association.[6] Cases of similar points of view could be multiplied.

[3] Capen, S. P., *op. cit.*, p. 48.
[4] Jessup, W. A., *op. cit.*, p. 119 ff.
[5] "Report of the Committee on Revision of Standards," *op. cit.*, p. 194.
[6] "Estimating State School Efficiency," *op. cit.*, p. 113.

As a matter of fact, it stands to reason that all school administrators, accrediting agencies, and others interested in evaluating the high school who accept the machinery of the school as the basis for measuring it, do so in or with the conviction that in taking stock of the institutional machinery involved they are measuring at least what the school might, could, would, or should accomplish educationally—and this brings up the next question in the present connection.

Can the high school as a social institution, functions included, be measured, at least indirectly and fairly adequately, on the basis of the institutional machinery involved? In other words, is it possible to use the different aspects of the institutional machinery involved as measurable variables concomitant with learning which may or may not be considered measurable, depending on the point of view?

The general use of the method of the arbitrarily defined standard in the measurement of the high school indicates that school men in general would tend to answer this question in the affirmative. But it should be remembered that tradition, common practice, and opinion have set the pattern of response in this connection. Very little work has been done by way of investigating the relation existing between the conditions of learning and the learning as such. As a matter of fact, not all of the conditions—even some of the more important conditions of learning, such as school morale, the mental health of the students and teachers, and other more or less subjective conditions—have, as yet, yielded to at least sufficiently accurate quantification; nor have all of the outcomes of the learning process yielded. Under such conditions, how could the relationship existing between the conditions of learning, on the one hand, and the outcomes of learning, on the other, be known beyond more or less mere assumption?

Thus, with so many unknowns involved on both sides of the equation, it would appear to be impossible, apart from chance coincidence, to measure the high school even indirectly and to a slight degree, on the basis of the institutional machinery involved. Even if all of the different aspects of the school machinery or conditions of learning as such were measurable, to measure them would not be to determine a basis for the evaluation of the school, because the educational significance of the measurements obtained would not be known.

However, if the equation in question could be solved once for all, that is, if the exact relationships between the two sets of variables involved were determined for all possible conditions, it would then be possible to measure the school in terms of the institutional machinery involved, i.e., the conditions of learning afforded, because, then, measurement of the conditions of learning would be equivalent to measuring the educational outcomes or the degree of actual or possible learning. The question then becomes: Can the relationship existing between at least a certain adequate number of the major conditions of learning and a certain representative number of the essential outcomes of the learning process be determined once for all; or, if not once for all, then for at least a representative sampling of the variables over a given relatively long period of time?

Educational research[7] indicates that this last question may be answered ultimately in the affirmative. Research has contributed and continues to contribute devices for the measurement of the classroom product and also the broader educational outcomes.[8] Also, research has developed and continues to work in the direction of more adequate devices for the measurement of the conditions under which learning takes place.[9] Furthermore certain studies[10] bearing on this question indicate at least possible procedures for the evaluation of the different aspects of the institutional machinery or conditions of learning, and afford at least some pertinent data.

What, then, is the relative validity of institutional machinery and educational outcomes as bases for the evaluation of the high school? Obviously, since the high school is maintained for certain educational purposes, and since the educational outcomes achieved by the school indicate the degree to which it achieves the purposes for which it is maintained, the educational outcomes are a valid basis for direct measurement. Also, since school machinery is necessary it constitutes a valid basis for indirect measurement, if and when the different aspects of the machinery are evaluated beforehand, in terms of the educational outcomes involved. Thus it would seem that institutional machinery and educational outcomes are equally valid as bases of measurement, if and when the relationship existing between them is definitely known.

Arbitrarily Defined Standards versus Objective Educational Tests as Criteria in the Measurement of the High School

The instruments of measurement required in the use of any given method of measuring anything for any given purpose are as significant, as far as the validity of the method is concerned, as is the basis of measurement involved. If the basis of measurement is not valid, then the method is not valid, even tho the instruments of measurement are valid and properly applied. On the other hand, if the instruments of measurement are not valid, the method of measurement is not valid, even if the basis of measurement is thoroly sound. It follows then, if these

[7] For a good bibliography in this connection, see: "Estimating State School Efficiency," *op cit.*, pp. 100-3. Also, it is a matter of note that several states already maintain statewide testing programs.

[8] See: Symonds, P. M. *Diagnosing Personality and Conduct.* Century Co., New York, 1931; Lang, A. R. *Modern Methods in Written Examinations.* Houghton Mifflin Co., Boston, 1930; Ruch, G. M. *The Objective or New-Type Examination.* Scott, Foresman and Co., Chicago, 1929; Ruch, G. M. *The Improvement of the Written Examination.* Scott, Foresman and Co., Chicago, 1924; Odell, C. W. *Traditional Examinations and New-Type Tests.* Century Co., New York, 1928; Garrett, H. E. *Statistics in Psychology and Education.* Longmans, Green and Co., Chicago, 1926; Woody, C. W., and Sangren, P. V. *Administration of the Testing Program.* World Book Co., Yonkers-on-Hudson, 1933; "Tests of Intelligence and Aptitude." *Review of Educational Research* 2:271-342, 1932; "Tests of Personality and Character." *Review of Educational Research* 2:183-270, 1932.

[9] See: "School Buildings, Grounds, Equipment, Apparatus, and Supplies." *Review of Educational Research* 2:343-441, 1932; also the references indicated in footnote 8.

[10] See: References in footnotes 2 and 7; also Remmers, H. H. and Trimble, O. C. "The Validity of the Indiana High School Accrediting Criteria." *Studies in Higher Education XX, Bulletin of Purdue University* 33:1-20, October, 1932.

assumptions are consistent, that the degree to which the basis of measurement and also the instrument of measurement are valid, to that degree the method of measurement is valid—assuming of course that the measuring instruments are properly applied. Consideration of the relative validity of the measuring instruments involved in the traditional and in the "scientific" methods of measuring the high school should, therefore, shed further light on the question of the relative merits and demerits of these two methods.

The first question in this connection is: Do the arbitrarily defined standards as required in the traditional method, and the objective educational tests as required in the "scientific" method, as ordinarily set up, include items of first importance as far as the functions of the school are concerned? The answer to this question must of necessity be general, because sufficient facts are not available for a specific answer. More and more systematic investigation of the institutional conditions of learning is required before specific conclusions are possible.

It is highly probable, however, that the schedule of arbitrarily defined standards generally set up includes a considerable proportion of items that are of relatively little significance, altho it may contain many items of first importance. It stands to reason that arbitrarily defined standards of such variables as the institutional conditions of learning are almost certain to be inadequate as criteria of such variables as the educational outcomes. Also investigational studies[11] show that the mechanical, arbitrarily defined standards now in general use are either not valid, or else they are not properly applied, both of which conditions may be true. In any case the measures obtained by the use of the arbitrarily defined standards would not be valid beyond the ability of school men to judge what was essential.

On the other hand, the objective educational tests now in general use in the measurement of educational outcomes are so constructed as to be highly valid. In general they are made by teachers of the different school subjects and by experts in test construction. Also they conform in content to the subject-matter of the courses offered. Furthermore in many cases at least item analyses of the tests are made by means of standard statistical techniques, and the items found to be too easy or too difficult are thrown out.

Thus it appears that objective educational tests include at least better selected items than do the schedules of arbitrarily defined standards generally used.

The next question is: Do the schedules of arbitrarily defined standards generally used and the objective educational tests available for use include a sufficient number of significant items bearing on the major aspects measured in each case to be reliable? In another connection, it has been indicated already that the arbitrarily defined standards do not include items bearing on such factors as school morale, mental hygiene, and some of the other more or less subjective conditions of learning, and also that the objective educational tests available do not include tests or items bearing on such factors as interests, attitudes, and

[11] See: Jessup, W. A., *loc. cit.*; also Remmers, H. H. and Trimble, O. C., *loc. cit.*

other broader educational outcomes. From this point of view, it is unknown whether either the arbitrarily defined standards or the objective educational tests contain a sufficient sampling of items to be reliable for the measurement of the total school situation. The inter-relationships among the different aspects of the total school situation would have to be determined. Thus the only conclusion possible from the standpoint of the number of significant aspects represented by the two devices is that either or both of the devices may or may not include a sufficient number of items bearing on the total situation. Research will have to determine the facts in this case.

But from another point of view, from the point of view of the number of items included in the ordinary schedule of standards and the ordinary educational test, do the two devices include a sufficient number of items to be reliable for measurements? The answer is, that in the case of the arbitrarily defined standards, the ordinary schedule may or may not contain a sufficient number of items to be reliable. The schedule of standards has not been investigated in this direction. But in the case of the objective educational tests, the coefficient of reliability has been determined; the reliability of the ordinary objective test (constructed as indicated above) ranges around .75, which means that the test contains a sufficient number of items to be reliable for at least group comparisons.[12] From the standpoint of objectivity in scoring both devices are reliable.

The last question in this connection is: Can the two devices under consideration, i.e., the arbitrarily defined standards and the objective educational tests as available at the present time, be defended on grounds other than opinion? In the case of the arbitrarily defined standards, the answer is "no." They are ordinarily formulated on the basis of the opinions of school men or on the basis of traditions which originally consisted of opinion. In general up to the present time, no attempt has been made by those defining the standards to evaluate, experimentally, the standards thus formulated. But the objective educational test is a product of experimentation; and it is being continually revised and improved upon. So the answer, in this case, is "yes."

Thus it would seem that the objective educational tests have the advantage of the arbitrarily defined standards—that is according to present status—in that so far as is known the tests are valid and reliable for at least group comparisons if not for individual comparisons, while the standards rest entirely on opinion.

Invoicing and Accounting Procedures versus Statistical Procedures in the Measurement of the High School

A method of measurement may be thoroly sound as far as the basis and the instruments of measurement involved are concerned, and still it may be rendered invalid by the procedure followed in measurement. In other words the procedure followed in measurement is just as important as either the basis of measurement or the instruments of measurement as far as the soundness of the method of measurement is concerned.

[12] See: Garrett, H. E., *op. cit.*, Chapter VI; also, Odell, C. W., *op. cit.*, pp. 41-6.

To the degree that any one of these three factors is valid or invalid to that degree the method is also valid or invalid.

Assuming for the present—altho it has been pointed out already that one of the methods is at least somewhat more valid than the other—that the method of the arbitrarily defined standard and the method of the objective educational tests in the measurement of the high school are equally sound as far as the bases and instruments of measurement are concerned, how do these two methods compare as to soundness of procedure?

The procedure ordinarily followed in measuring the high school by the method of the arbitrarily defined standard, as has been indicated already, is essentially a matter of invoicing and accounting on the basis of the standards set up. The invoicing, usually, involves (1) summarizing the data contained in the school records and reports, and (2) supplementing the data thus obtained with data obtained by observation. The accounting, as a rule, consists of rating the schools in the light of the standards.

Now information based on records and reports is reliable only to the degree that the records are accurately and uniformly kept and to the degree that human judgments are consistent. In keeping records and also in reports some persons are much more systematic, accurate, and conscientious than other persons. In these traits people in general are extremely variable even when standard forms are used;[33] and it would seem that school people are not exceptions to the rule.

Also, data obtained by observation are reliable only to the degree that observers agree among themselves or to the degree that an observer is consistent from one time to another in his observations; and it is highly probable that information obtained in observation of the conditions of learning in the school situation is not highly reliable. The school situation is so complex and changing that no two observers would, except more or less by chance, note the same things, and no single observer would note the same things in the same manner at different times.

Furthermore the accounting involved in the application of arbitrarily defined standards is no more reliable than ratings; and ratings, tho considered as scientific when no better measures are available, are at best not highly accurate.[34]

On the other hand, the procedure ordinarily followed in the administration of a testing program is essentially a matter (1) of giving and scoring tests according to printed instructions, and (2) of interpreting the results according to well-established procedures. In this procedure the human element enters, as in the case of invoicing and accounting, but in all probability not to the same extent—the instructions are uniform; the scoring devices are uniform; and the statistical formulae are uniform; and besides all three of the elements of this procedure are based upon experimentation.[35]

Thus it would seem that the procedure required in the measurement

[33] See: Symonds, P. M., *op. cit.*, Chapter II.

[34] See: Symonds, P. M., *op. cit.*, Chapter III; also Griffitts, C. H. *Fundamentals of Vocational Psychology.* Macmillan Co., New York, 1924. Chapter VII.

[35] See: References indicated in footnote 8.

of the high school by the method of the objective educational test meets the requirements of science to a somewhat greater degree than does the procedure required in the measurement of the high school by the method of the arbitrarily defined standard.

Some Cases in Point

In order to indicate a basis of investigational fact for the positions taken thus far on the question of the relative merits and demerits of the method of the arbitrarily defined standard and the objective educational test in the measurement of the high school, three clear cases of the measurement of the high school by means of both the method of the arbitrarily defined standard and the method of the objective educational test are presented here. It turns out that all three of these cases involve measurements by high school accrediting agencies on the one hand, and, on the other hand, measurements directed by state institutions of higher learning. But since accrediting agencies are the most consistent users of the method of the arbitrarily defined standard, and since the institutions of higher learning seem to be taking the initiative in promoting the method of the objective test, the three cases presented here should be especially pertinent to the present question.

The first case presented[16] is a case reported by President Jessup of the State University of Iowa.

In this case, nearly 400 high schools in Iowa were measured by the administration of objective examinations in fourteen high school subjects to the students enrolled—some 60,000 students in all. The schools thus measured were classified at the time as accredited or non-accredited by the North Central Association of Colleges and Secondary Schools, which accrediting agency had already classified these schools by the method of the arbitrarily defined standard.

The results, as presented by President Jessup, are as follows:

"Analyses of the results [of the testing program described above] by Dr. Lindquist [E. F. Lindquist, Associate Professor of Education, State University of Iowa] show the variability in composite school averages in any one subject for all of the schools is as great as the variability of individual achievement in a typical school; that is, the difference in average achievement between the best and the poorest school in a subject such as English or mathematics, or for all subject combined, is as great as the difference between the best and the poorest student in the typical school. This variability is found even when the supposedly best schools alone are considered. Thus many schools that have the same external standards of selection of teachers, teaching load, building, and other conditions to meet the North Central Association list rank actually lower than other schools which are not accredited. Indeed, an array of 92 North Central high schools and 283 non-accredited high schools distributed for average composite student scores revealed almost complete overlapping; that is to say, 97 per cent of the non-accredited high schools show average composite scores in the same range as 98 per cent of the North Central schools.

[16] See: Jessup, W. A., *op. cit.*, pp. 116-18.

"Fourteen per cent of the non-accredited schools had an average score which exceeded the average of all accredited schools. Again each school in the upper one-third of the non-accredited list was superior to each school in the lower one-third of the accredited schools." [17]

The second case,[18] very similar to the one just described, is reported by Dr. Remmers and myself.

In this case 304 high schools in Indiana were measured by both the North Central Association and the Indiana State High School Testing Service with Dr. Remmers as chairman, the one using the method of the arbitrarily defined standard and the other the method of the objective educational test.

The results reported show that "The picture of overlapping (the accredited with the non-accredited group) is much the same for all five of the branches of study presented (mathematics, science, social science, English, and Latin). The overlapping is extreme. In almost every case some of the schools in one or the other two unapproved groups (i.e., the second and the third class groups as per the Indiana high school accrediting agency) stand superior in the scale of T-scores (composite achievement scores) to the highest schools in the group approved by the North Central Association. Also, a relatively small percentage of the two unapproved groups fall below the lowest ranking schools in the approved group. Furthermore the average schools in the three groups (one accredited and two not accredited by the North Central Association) are not widely separated (on the scale of achievement scores)." [19]

The third case[20] is also a case reported by Dr. Remmers and myself. The only difference between this case and the previous one, as far as this discussion is concerned, is that the Indiana high school accrediting agency takes the place of the North Central Association as one of the agents of measurements.

The results in this case indicate that, "On the average 3 per cent of the second-class (continuous commission) and 3 per cent of the third-class (conditional commission) schools stand equal or superior to the highest standing schools in the first-class (first-class commission) schools, on the basis of measured achievement. Also, on the average approximately 71 per cent of the second-class schools and 89 per cent of the third-class schools stand equal or superior to the lowest standing schools in the first-class schools. Furthermore, on the average approximately 27 per cent of the second-class schools and 33 per cent of the third-class schools reach or exceed the mean of the first-class group." [21]

It is obvious from the data of these cases that measurement of the high school by the method of the arbitrarily defined standard determines a result that is radically different from the result obtained in the measurement of the high school by the method of the objective educational test. A re-classification of the schools included in any one or all of the three cases just described, on the basis of student-achievement in the

[17] *Ibid.*, p. 116f.
[18] See: Trimble, O. C. and Remmers, H. H., *op. cit.*, pp. 25-35.
[19] *Ibid.*, p. 30f.
[20] See: Trimble, O. C. and Remmers, H. H., *op. cit.*, pp. 11-25.
[21] *Ibid.*, p. 21f.

different high school subjects, would radically change the classification as determined on the basis of the arbitrarily defined standards used. Apparently, at least, the two methods are not designed to measure the same thing; or the instruments of measurement required in the use of one of the methods are more or less invalid or unreliable while the instruments required in the use of the other method are valid and reliable to a considerable degree; or the procedures involved in the use of one of the methods are unreliable while the procedures involved in the use of the other method are at least fairly sound.

Now, since the method of the objective educational test involves the use of educational outcomes, i.e., the end results for which the school is maintained, as bases of measurement, while the method of the arbitrarily defined standard involves the use of school machinery, i.e., factors presumably highly correlated with the educational outcomes, as bases of measurement, and, since the instruments of measurement required in the use of the method of the objective educational test are based on research and experimentation, while the instruments required in the use of the method of the arbitrarily defined standard are based largely on tradition and opinion, and further, since the procedures followed in measurement by the method of the objective educational test are at least fairly sound scientifically, while the procedures followed in measurement by the method of the arbitrarily defined standard are at best rating procedures, it seems only reasonable to conclude that the method of the objective educational test is a much more adequate method of measuring the high school than the method of the arbitrarily defined standard—that is, in their present forms.

Conclusion

In conclusion, it should be pointed out that altho the evidence, both the theoretical and the investigational facts, is decidedly in favor of the method of the objective educational test over the method of the arbitrarily defined standard in the measurement of the high school, the issues involved are by no means settled. Of course, as defined and used at present, the method of the objective educational test doubtless is a much more valid and reliable method of measuring the high school than is the method of the arbitrarily defined standard. The evidence is clear enough on this point. But this fact does not preclude the possibility that a schedule of mechanical standards which would be as valid and reliable as, and perhaps even more feasible than the method of the objective educational test, could be set up.

However, before such a set of mechanical standards could be set up it would be necessary to determine the relationship existing between the institutional conditions of learning, on the one hand, and the educational outcomes, on the other, in order that the really significant items of institutional machinery could be selected. The solution of this problem would, obviously, involve the use of the method of the objective educational test for the evaluation of the educational outcomes; and it would seem to be a very extravagant procedure to say the least, first to measure the mechanical factors and then to measure the school in terms of such

factors, when the school could be measured directly in terms of the measures used to evaluate the mechanical aspects. But, still there is at least a bare possibility that a set of standards bearing on more or less functionally stable mechanical aspects of the school could be found; in which case at least fairly accurate measurement of the high school could be accomplished perhaps without the expenditure of as much time, effort, and money as would be required in measurement by the method of the objective test.

In any case, apart from the fact that, as they now stand, the method of the objective test more nearly meets the requirements of science than does the method of the arbitrarily defined standard, the solution of all of the problems indicated here requires extensive and systematic investigation of (1) the conditions under which learning takes place, and (2) the degree to which the school, in all its aspects, influences, maintains, and controls the conditions for learning in the direction of the educational goals set up.

An Analytical Study of the Factors Involved in Learning to Appreciate Literature

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Introduction

This study is the outcome of a desire to know what conditions and activities contribute to learning to appreciate literature.

The method of procedure is that of making an analysis of the nature of the learner's activity by means of (1) a survey of experimental studies which purpose to set forth or test some phase of the experience; (2) a search of treatises on aesthetics as they relate to the response of the learner; (3) an investigation of studies on the methods of teaching literature; and (4) oral interviews with persons who are regarded, because of their position, as having acquired some degree of appreciation. From these sources a list of the activities on the part of the learner and of the factors contributing to the learning condition has been compiled.

The factors thus assembled are classified under the items listed in Section A of the questionnaire. These factors were to be ranked in the order of their importance in contributing to the initiation or development of appreciation. A more detailed analysis of these items led to a group of 68 factors. These factors, as well as the activities, were checked for their relative importance by experts in the field of English. This procedure was followed in order to see what those who are regarded as being able to appreciate literature deem necessary to be done by those who would learn how to appreciate.

In addition, a group of theses involving principles held by some as being fundamental to the appreciation of art was assembled. These theses were arranged in two divisions. In Division I theses were presented for acceptance, rejection, or restatement on the basis of their contribution to learning to appreciate the arts. In Division II theses or principles pertaining to learning to appreciate the arts were stated in alternate forms. A check was to be placed before the acceptable form; if neither was acceptable the principle was to be restated.

The wide scope of the field of appreciation of literature for experimental and theoretical investigation constitutes in itself a barrier to the undertaking of such study. Yet the very intricacy and complexity of the problem invite inquiry on the part of students of psychology who wish to know what it is that goes on in the mind of a person who reads with appreciation a literary work.

It is necessary at this time to note the interpretation of the word "appreciate." Literally the meaning is "to set a price upon; to give judgment of value." A secondary meaning is that of enjoyment. In

any given situation the quality and degree of appreciation depends upon the nature of the reaction of the human organism (the one who is experiencing) to the matter or object being appreciated. This reaction is affected by the attitude of the individual, the condition of the organism, and the nature of the material presented. In a situation which may or may not call forth appreciation there are constant changes—desires, wishes, and intentions. Even slight changes in one or another factor of the situation may introduce marked changes in the adjustment.

It is not sufficient to recognize the value of appreciation as a phase of human experience. To know this worth is of slight importance if one does not know what are the activities, the conditions, and the elements that make up the appreciative act; in other words, if one does not know the way in which this appreciative response may be evoked. The increased development of psychological investigation, and especially the opening of new fields of inquiry, will in time afford us a more exact and definite knowledge of that attainment known as the appreciation of the arts. A thesis fundamental to the study of appreciative learning by means of literature is that the appreciative attitude be considered as a learning process, valuable as an acquisition. This evaluation should find expression not alone in the course of study as such but also in the minds of those who train teachers, that is, in the minds of those who have in their hands the formation of a technique to be followed.

Thruout the history of literature study, appreciation has been considered as the product of literature teaching, an achievement to be sought. Emphasis has, however, varied from one basis to another, with the appreciative attitude as a fundamental objective. If there is a possible analysis of the complex known as appreciation, there may follow the introduction of such content of matter by such methods as to stimulate the appreciative attitude. Some progress has been made towards this analysis, tho it has been by piecemeal. It is the purpose of the author to summarize and relate these studies, and by so doing (*a*) to show the evolution of this analysis, (*b*) to set forth the present knowledge of appreciation as a form of learning, and (*c*) to suggest some further methods of attacking the problem.

Review of Studies

Many studies dealing with the rôle of the learner in the psychological process of appreciating literature are based upon the investigation of various physical stimuli as they operate in the appreciation response. A number of these studies are listed below, together with the stimuli investigated:

1. Miss Bamberger made a study on the external conditions of books as factors affecting choice.

2. Miss Elder and Miss Carpenter made a study, one phase of which dealt with the effect of physical make-up on the choice of books by high school students.

3. Givler studied vowel and consonant quality as well as the quantity and periodicity of sounds as a basis for the arousal of aesthetic consciousness from poetry.

4. Sapir made a study of the phonetic symbolism of adult language.

5. Newman investigated phonetic symbolism in the language of children. The symbolic judgment of language is declared to have an objective basis.

6. Miss Gordon attempted to find out the common external bases for aesthetic judgment.

The physiological reactions as they operate in the appreciative response have been dealt with in other investigations.

1. Leontiev studied experimentally, by the control of stimuli presented to the individual, the organic reactions involved in the building of likes and dislikes.

2. Young studied the mechanism of organic response—the development of feelings of pleasantness and of unpleasantness.

Certain investigators have sought to determine the measure of dependence between intelligence and ability to learn appreciation.

1. Miss Huber studied the influence of intelligence upon children's reading interests. Intelligence scores were taken before the determination of differences in choices. Preferences were distinctly different and were consistent for various degrees of intelligence as so measured.

2. Carroll and Eurich tested art appreciation by the McAdory and Meier-Seashore tests. They correlated these scores (*a*) with intelligence and (*b*) with achievement in college courses.

3. Christensen and Karwoski set up a test in art. The results, in general, correlated with intelligence.

The relationship between general and specific abilities as they may function in developing an ability such as learning to appreciate literature is suggested by the studies which follow:

1. Carroll made an experimental study on the effect of specific practice in learning to read directions. He stated that drill brings improvement; interest, stimulation, and a check on progress are necessary, and the improvement made should be known by the subject.

2. Miss Waring studied the relation between early language habits and conduct control, i.e., what do children do which tends to promote language habits, and what do adults do to promote standards of conduct. She found that success, approval, language habits, and concepts are determiners of conduct.

3. Thorndike studied individual differences in the judgment of a simple form.

4. Stenquist's measurement of mechanical ability throws light on differentiation in specific ability as correlated with general ability.

5. Bernard Hart and Spearman set forth data pertaining to general ability and specific factors as they function in performance.

6. Schachtman analyzed the relationship between ability to judge poetry and other acquisitions of knowledge, such as ability in grammar, etc.

The factor of comprehension as it relates to appreciation has likewise been investigated.

1. Irion measured the ability to master subject-matter as expressed. He conceived of appreciation as being dependent upon comprehension.

2. Miss Weeks assumed figurative language and sentence structure to be factors of meaning in the study of literature.

3. Moody measured reading ability by finding out whether the subject could pick out the central thought.

Interest is also studied as a factor contributing to the appreciative response.

1. Jordan studied children's interests in reading. He made an attempt to find out what types of literature call for the condition which demands interest and appreciation.

2. Miss Dunn studied the interest of children in reading material in Grades 1 to 3.

3. Wissler studied the interests of children in reading, by means of questions on what was remembered.

4. Miss O'Shea studied the effect of interest on ability to learn vocabulary.

5. Miss Grant and Miss White studied children's choices of reading and found need for (*a*) literary material within their comprehension, and (*b*) material of interest to children.

6. Miss Green investigated the relation between reading for fun, reading ability, and kind of reading.

7. Ballard made a test to find out preferences as to the form in which a story is cast.

Imagery as a factor in learning to appreciate is the subject of certain studies.

1. Lay analyzed the different sensuous images to which he reacted in the first 1,000 lines of "Marriage of Geraint," and Browning's "Ring and the Book."

2. Griffiths studied introspectively his imagery in the reading of "Kim."

The following studies deal more particularly with the objectives set forth as a measure of the acquisition of appreciation.

1. Crone set up the goals for literature, on the basis of judgment on the part of the high school student, as (*a*) leisure-time activity, (*b*) moral influence, (*c*) aesthetic influence, and (*d*) permanent influence.

2. Bishop set up the goal in literature as the appreciation of its value and of elements in it which are common to life.

3. Miss Crawford analyzed achievement in literature teaching as the comprehension of (*a*) plot, (*b*) character, and (*c*) the social and ethical ideas set forth.

4. The "Effective Word Placement in a Particular Situation" test conceived of aesthetic tests as being evidenced by the selection of a word on the basis of (*a*) its appropriateness of meaning in the context, (*b*) its musical quality, (*c*) its metrical adaptation, and (*d*) its adaptation to the mood of the excerpt.

5. Miss Moran analyzed the appreciative response as being conditioned by (*a*) the ability to infer specific meaning from unfamiliar, unusual words, (*b*) response to the music of the verse, and (*c*) sensitiveness to sensory images.

Objective goals may take the form of tests as they function in the acquisition of appreciation from teaching literature.

1. Abbott and Trabue made no analysis of the factors in judging poetry. They searched for some objectified way of determining similar aptitudes in the writer and reader.

2. Speer's measurement of appreciation in prose, poetry, and art was based on the assumption that recognition of merit is essential to appreciation.

3. The Logasa-Wright tests analyzed the student's discriminative power as (*a*) discovery of theme, (*b*) association of various pieces of literature having common themes, (*c*) the degree to which the reader participated in the selection, (*d*) reaction to sensory images, (*e*) response to rhythms, i.e., recognition of differences between them, (*f*) distinction between true and false imagery, (*g*) discovery of fresh and vivid expression, and (*h*) the establishment of certain criteria of judgment to be applied to poems, e.g. universality of theme, and sincerity of the author's attitude.

4. Cavin, in his test in American poetry, tested the thought of a poem and the understanding of minor difficulties.

5. Moe tested whether a student could read a book with comprehension.

6. Barrett and Miss Ryan tested for facts remembered about the literature.

7. Thorndike tested aesthetic appreciation by the choice of a line to complete a couplet.

8. Detroit literature appreciation tests set up literature achievement as ability to distinguish (*a*) qualities of literary productions, (*b*) characteristics of writers, (*c*) literary history, and (*d*) identification of common verses.

Certain studies have been made in related arts to determine the factors involved in learning to appreciate.

1. Miss McAdory constructed objective tests for the recognition of artistic merit. The art element is measured by (*a*) line, (*b*) form, and (*c*) color.

2. Meier, in dealing with the graphic arts, developed a series of tests on the assumption that aesthetic judgment as related to composition is an indication of art talent.

3. Lewerenz tested ability to judge art forms by testing ability in (*a*) discrimination of color, (*b*) visual memory of proportion, (*c*) observation, (*d*) analysis, (*e*) originality, and (*f*) recognition of aesthetic proportion.

4. Seashore devised tests of musical talent. He conceived of a hierarchy of talents, and based the tests on (*a*) the attributes of sound, and (*b*) the powers of the human mind.

5. Miss Whitley held that listening to music involves (*a*) direct listening, (*b*) response by the special things of which the listeners are made to think, (*c*) the emotional mood induced, (*d*) the analytical or intellectual appreciation of music, and (*e*) the imagery induced.

6. Damrosch believed music appreciation should be taught as depending on (*a*) a knowledge of the instruments played, (*b*) a knowledge of composers, and (*c*) learning to interpret the melody.

7. Lyman studied experimentally the effect of using the fine arts correlated as aids in acquiring the appreciative response.

The interdependence of instruction and the learning of appreciation has been the basis of several studies.

1. Miss Hartley studied the essential knowledge which an English teacher should have, on the assumption that what is not known cannot be taught. She conceived of the comprehension of meaning as being conveyed by (*a*) figures, (*b*) sense impression, (*c*) suggestion of implication, and (*d*) literal expression when typically condensed or structurally irregular.

2. Miss Scott approached the teaching of the graphic arts from the point of view of introducing such practices as call forth the appreciative response. The method involved (*a*) sensations, (*b*) feelings, (*c*) subject-matter, (*d*) suggestiveness of subject-matter, and (*e*) images in connection with the subject-matter presented.

3. Miss Broening studied the development and measurement of achievement in learning to appreciate literature. Selections were chosen, groups were selected, and conditions were set forth which were applied as stimuli to arouse the appreciative response. Results of the study indicated that appreciation, or its elements, is a function that is learned and hence is teachable.

This review of studies leaves the impression of a purpose variously expressed. Just what are the psychological conditions and processes involved when there is appreciative absorption of a literary work? Questions of values, or judgments, are dealt with in a more or less unscientific way. There may be the omission of essential elements and the inclusion of disturbing factors. Yet we may hold that certain definite conditions contribute to the appreciation of literature. The impressionistic character of this survey reveals the necessity for a method of determining some definite points of attack on the subject.

Results of the Questionnaire

Approximately 800 of the questionnaires were distributed to teachers in summer sessions in 20 different institutions of higher learning in various sections of the United States. With one exception, that of Indiana University, these teachers were listed as members of the English faculty of their respective institutions and the students to whom they were asked to submit the questionnaire were students taking courses in the methods of teaching English or reading. Those from Indiana University who filled out the questionnaire were in almost all cases students in graduate courses in education. Two hundred seventeen of the questionnaires were returned either partially or completely filled out. Returns were received from 12 of the 20 institutions.

Seven general items that contribute to the development of appreciation were listed in the first division of the questionnaire. Those who answered the questionnaire were asked to rank these in the order of their importance. The directions for ranking are given below with the seven items.

A. Rank each of the following in order of importance as you consider that they contribute to the development of appreciation. Place a "1" before the one which you consider most important; a "2" before the one next in importance; and so on.

.... Goal or objective perceived by the learner.
.... The present environment of the learner.
.... The physical condition of the learner.
.... The mental set or attitude of the learner.
.... A knowledge on the part of the learner of the difficulties to be overcome in acquiring ability to appreciate.
.... A knowledge on the part of the learner of the things to be done in developing appreciation.
.... Statements about the material to be appreciated.

Tabulation was made of the ranking of each of these items by the whole group and by each of the differentiated groups. Table I gives a composite view of the ranks assigned by each of these groups to the seven general items which are held as fundamental for the appreciation of literature.

TABLE I. COMPARISON OF RANK ASSIGNED BY WHOLE GROUP AND BY DIFFERENTIATED GROUPS TO ITEMS THAT CONTRIBUTE TO THE DEVELOPMENT OF APPRECIATION

Groups	I	II	III	IV	V	VI	VII
General group	2	3	4	1	6	5	7
Student group	2	3	5	1	6	4	7
Teacher group	2	3	4	1	6	5	7
English teacher group	2	3	4	1	7	6	5
Elementary teacher group	3	2	4	1	5	6	7
Classification not known	3	2	6	1	5	4	7
Miscellaneous group	3	2	4	1	6	5	7
Men	3	2	4	1	7	5	6
Women	2	3	4	1	6	5	7
Group 18-25 years of age	2	3	5	1	6	4	7
Group 26-35 years of age	3	2	5	1	7	6	4
Group 36 years of age and above	2	3	4	1	6	5	7

In many cases wide differences of opinion were shown. Considerable agreement was shown, however, in the rating of Item 4, which was given first rank by the combined rating. Second importance was assigned by the group to the learner's perceiving the goal or objective. The present environment of the learner was assigned third place, and fourth rank was given to the physical condition of the learner. A knowledge on the part of the learner of the things to be done in developing appreciation was given fifth position, while a knowledge on the part of the learner of the difficulties to be overcome in acquiring ability to appreciate was placed sixth. Statements about the material to be appreciated was considered of least importance.

The next part of the questionnaire called for reactions relative to a number of factors regarded as being involved in learning to appreciate the arts. These 68 factors follow.

Place a check mark in the column to the left of each factor mentioned below, indicating the relative degree of importance which this factor plays in or contributes to the process of learning to appreciate good literature.

"L" is considered as meaning low or below average in importance.
"A" is considered as meaning average importance.
"M" is considered as meaning that the element is considered of great importance.
"N" means that in your judgment the element or factor plays no part in learning to appreciate good literature.

L	A	M	N		
....	....	....	....	1.	Knowledge of technicalities of literary craftsmanship
....	....	....	....	2.	Interest in technicalities of literary craftsmanship
....	....	....	....	3.	Comprehension of meaning
....	....	....	....	4.	Proper interpretation of facts
....	....	....	....	5.	Recognition of merit
....	....	....	....	6.	Self-identification with the author
....	....	....	....	7.	Possession and invigoration of lofty ideals by the learner
....	....	....	....	8.	Satisfaction of pleasure produced by the desire for beauty
....	....	....	....	9.	Recall of specific sense perceptions
....	....	....	....	10.	Memory of what is read
....	....	....	....	11.	Understanding of cause and effect of motives and actions
....	....	....	....	12.	Ability to correlate the thought of the selection with the learner's past experiences and to recognize the familiar
....	....	....	....	13.	Emotional attitudes associated with the learner's experiences
....	....	....	....	14.	Equipment of many ideas—on the part of the learner
....	....	....	....	15.	Perception of sensory details
....	....	....	....	16.	General background—cultural or non-cultural
....	....	....	....	17.	Environmental stimulation favorable to reading
....	....	....	....	18.	Certain classroom atmosphere required to arouse a favorable mood—tempo of class exercises, etc.
....	....	....	....	19.	Physical aspects of the material offered for reading, such as size, form, color, binding
....	....	....	....	20.	Attitudes, tastes, and certain predispositions of the teacher due to the variety and depth of his experiences
....	....	....	....	21.	Physiological state of the learner's organism while reading which changes the learner's sensibilities
....	....	....	....	22.	General sensory acuity—considered as a necessary physiological condition
....	....	....	....	23.	Learner's imagery—power of ability to get word pictures—including the ability to recall, invent, and review past experiences
....	....	....	....	24.	Awareness of the significance of small and essential details
....	....	....	....	25.	Habit of observing carefully and extensively
....	....	....	....	26.	Extended and accurate information
....	....	....	....	27.	Extensive experience, vital and personal
....	....	....	....	28.	Span of attention
....	....	....	....	29.	Familiarity with the medium of expression used by literary writers
....	....	....	....	30.	Ability to read
....	....	....	....	31.	Student's attitude, whether favorable and receptive, including feeling of at-homeness, and self-identification
....	....	....	....	32.	General need for spontaneity and enthusiasm
....	....	....	....	33.	Need for harmony between the nature of the learner and his environment
....	....	....	....	34.	Need for individuality in reaction—indicated by independence of spirit
....	....	....	....	35.	Strict attention to matter read, rather than to one's self
....	....	....	....	36.	Suspense or lack of suspense
....	....	....	....	37.	Language difficulties (figurative, irregular sentence forms, obscurities in meaning, concentration, elimination, and selection)
....	....	....	....	38.	Personality of author
....	....	....	....	39.	Irrelevant, harmful attention to details
....	....	....	....	40.	Interruptions during act of appreciation

L	A	M	N		
....	....	....	....	41.	Elimination of dislikes, and deep-rooted wrong tastes
....	....	....	....	42.	Readiness to accept suggestions and recommendations
....	....	....	....	43.	Study of meaning not of medium thru which the thought is expressed
....	....	....	....	44.	Necessity for considering and evaluating the result desired
....	....	....	....	45.	Necessity for considering and developing a proper method for attaining the desired result
....	....	....	....	46.	Acquisition of knowledge of such art forms as the following: Language—(symbolisms, diction-style, rhythm, rhyme, allusions, vocabulary, sentence structure, pictorial, descriptive quality, and verse forms) Mastery of thought—(concrete, abstract, factual material, story-plot-action, human interest, ethical allusions and principles)
....	....	....	....	47.	Cultivation of perceptive power
....	....	....	....	48.	Sensitivity to an author's style or to style in the abstract
....	....	....	....	49.	Ability to recall sensory images
....	....	....	....	50.	Adaptation of material to the learner—ease, sureness, confidence, and facility in reading
....	....	....	....	51.	Appeal to the interest of the learner—so the selection will attract his attention and arouse him to action
....	....	....	....	52.	Character of initial presentation (Must it create activity on the part of the learner? Does it appeal to his actual experience so that the proper ideas are aroused?)
....	....	....	....	53.	Seeing a thing to be appreciated in its proper setting—in its space and temporal relationship
....	....	....	....	54.	Enthusiastic, emotional understanding of mood and attitude
....	....	....	....	55.	Acquisition of specific meanings from unfamiliar or unusual words
....	....	....	....	56.	Seeing the congruity of the idea expressed and the adequacy of the author's expression
....	....	....	....	57.	Ability to see and recognize the appeal of treatment so as to increase the learner's motivation producing pleasurable anticipation
....	....	....	....	58.	Seeing the presentation as a whole and also the significance of the parts
....	....	....	....	59.	At-homeness with the selection—self-identification, leading to the discovery of capacities, aptitudes, talents
....	....	....	....	60.	Arousal of a sense of pleasure, resulting perhaps in a sense of power
....	....	....	....	61.	Making immediately a variety of responses to the media read
....	....	....	....	62.	Possession or development of a physiological sense of rhythm by oral reading
....	....	....	....	63.	Fixation of the appreciation response thru practice and continuous reconstruction of experiences under the most favorable conditions
....	....	....	....	64.	Intensity and vivid character of the experiences needed to appreciate good literature
....	....	....	....	65.	Emphasis on mental traits as a means of developing attitudes and predispositions
....	....	....	....	66.	Practice in reading good literature
....	....	....	....	67.	Noting the enjoyment and satisfaction that come when reading good literature
....	....	....	....	68.	Experience in or introduction to literary production

Table II shows the rating of those who answered the questionnaire as to the importance of the factors in this part and offers an opportunity for studying the reactions to each by the differentiated groups responding.

TABLE II. PERCENTAGE OF PERSONS ACCORDING TO GROUPS ASSIGNING INDICATED VALUES TO THE 68 ITEMS ON THE CHECK LIST

	Teaching Field																Sex								Position								Age							
	English				Elementary				Not Known				Miscellaneous				Female				Male				Teacher				Student				18-25				26-35				36 Above			
	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N
1.....	39	36	6	19	38	48	15	15	38	39	10	13	29	33	12	26	37	35	8	20	32	46	10	12	35	38	8	19	35	37	12	16	36	39	11	14	33	36	12	19	30	50	5	15
2.....	24	46	7	24	35	45	10	10	47	40	7	6	42	32	12	14	31	37	9	23	40	41	10	9	34	39	7	20	44	42	8	6	37	39	11	13	33	43	6	18	50	35	..	15
3.....	..	6	94	..	..	10	90	..	..	5	95	..	2	5	93	..	..	7	91	2	1	8	91	..	1	7	90	2	..	4	96	..	..	7	92	1	1	9	88	1	..	5	95	..
4.....	1.49	34	63	1.49	5	10	81	5	..	31	67	1.42	..	35	65	..	1	30	68	1	..	31	66	3	1	31	67	1	..	32	66	2	..	26	73	1	..	33	65	2	..	40	60	..
5.....	13	50	33	4	5	45	40	10	16	44	34	6	8	48	39	6	11	48	36	5	11	44	36	9	11	51	30	8	14	45	33	8	10	46	39	5	10	51	32	7	15	52	33	..
6.....	15	33	38	15	21	33	42	4	12	51	28	10	18	41	24	16	14	44	32	10	17	42	24	17	18	36	35	11	10	57	18	15	13	54	23	10	17	38	34	11	20	25	45	10
7.....	14	43	24	19	21	16	42	21	25	43	19	13	24	39	29	8	25	33	28	14	20	41	30	9	21	36	32	11	5	63	17	15	33	33	19	15	13	32	38	17	17	50	33	..
8.....	4	32	58	7	..	26	47	26	9	4	76	11	3	33	40	23	5	34	53	8	3	41	53	3	5	33	57	5	4	41	47	9	3	45	44	9	6	27	64	3	15	35	50	..
9.....	14	35	37	14	5	45	40	10	16	46	34	3	15	36	42	8	16	37	38	9	14	45	36	5	15	40	37	8	18	41	33	8	16	39	37	8	17	47	27	9	10	35	55	..
10.....	19	56	20	6	..	50	35	15	21	44	29	6	20	48	28	4	18	44	27	11	20	52	25	3	18	50	26	6	22	42	21	15	18	48	26	8	26	39	32	3	24	48	28	..
11.....	16	37	41	6	14	43	33	10	16	46	26	12	21	23	47	9	13	40	42	5	19	35	35	11	17	36	38	9	23	45	21	11	21	38	36	5	16	40	29	15	20	30	50	..
12.....	1	24	75	..	..	25	70	5	7	22	70	1	..	18	82	..	2	14	84	..	4	24	71	1	1	21	77	1	10	10	80	..	7	16	76	1	1	28	71	..	..	10	90	..
13.....	4	39	55	1	4	16	68	12	13	26	56	4	4	29	65	2	10	33	52	5	1	26	66	7	8	32	55	5	6	30	63	2	6	37	54	3	9	31	52	8	2	14	84	..
14.....	10	44	37	10	12	35	41	12	15	42	38	5	3	29	60	7	9	39	44	8	16	31	45	8	11	37	46	6	10	42	38	10	10	36	46	8	15	36	44	5	13	32	55	..
15.....	26	31	36	7	5	50	35	10	27	36	21	15	20	44	28	8	23	34	34	8	26	44	17	13	23	38	21	18	22	39	26	13	24	38	26	12	25	38	21	16	24	33	38	5
16.....	11	55	35	..	4	28	64	4	9	38	49	4	6	36	67	..	9	45	44	2	6	40	50	4	8	46	45	1	8	35	53	4	11	39	44	6	8	46	46	..	..	53	47	..
17.....	6	40	54	..	5	40	45	10	17	32	45	6	11	36	51	2	10	33	54	3	11	46	40	3	8	37	52	3	18	37	37	8	12	37	46	5	11	38	48	3	5	43	52	..
18.....	4	38	56	1	16	37	42	5	14	50	31	6	14	30	54	2	8	37	53	2	15	41	35	9	8	37	52	3	21	44	31	4	14	39	43	4	8	33	55	4	10	55	35	..
19.....	33	37	21	10	26	53	11	11	22	42	14	22	28	46	11	15	27	43	16	14	30	37	11	22	29	40	18	13	24	40	13	23	26	39	13	22	26	41	18	15	40	45	5	10
20.....	4	25	71	..	10	20	65	5	7	28	63	1	4	40	56	..	4	31	63	2	11	27	58	4	5	26	69	1	4	40	54	2	8	38	52	2	3	26	71	..	11	26	58	5

| | | |

TABLE II—Continued

	Teaching Field																Sex								Position								Age											
	English				Elementary				Not Known				Miscellaneous				Female				Male				Teacher				Student				18-25				26-35				36 Above			
	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N	L	A	M	N
51.....	1	21	76	1	5	14	76	5	4	19	77	..	..	19	79	2	2	13	84	1	3	20	75	2	1	20	78	1	6	19	75	..	6	20	70	4	..	16	82	2	..	91	9	..
52.....	6	20	72	3	5	19	67	10	6	26	62	6	4	33	58	4	5	20	70	5	7	38	50	5	5	21	69	5	8	30	54	8	4	27	62	7	6	27	61	6	5	25	70	..
53.....	16	43	37	4	10	48	24	19	9	40	47	4	6	31	56	6	11	41	42	6	10	41	45	4	9	44	40	7	10	33	46	11	9	45	38	8	11	33	51	5	10	58	32	..
54.....	3	33	61	3	5	45	40	10	9	43	47	1	4	38	52	6	5	38	55	2	7	40	47	6	5	38	52	5	8	46	44	2	5	41	52	2	6	39	48	7	5	27	68	..
55.....	25	53	12	10	45	18	32	5	25	51	18	6	27	40	27	6	27	55	14	4	21	43	32	4	26	46	20	8	28	50	20	2	28	49	19	4	27	44	21	8	41	41	14	4
56.....	17	46	30	7	10	35	45	10	17	52	25	6	20	54	22	4	16	49	29	6	18	49	26	7	17	48	27	8	16	55	24	5	15	47	32	6	17	56	20	7	24	48	24	4
57.....	16	49	29	6	..	48	24	29	34	36	22	7	6	36	51	6	16	43	32	9	20	34	38	8	14	43	35	10	31	35	29	5	19	48	25	8	13	38	34	15	27	32	41	..
58.....	1	29	68	3	10	14	72	5	14	27	58	1	..	28	67	4	7	24	65	3	5	33	62	..	5	27	64	4	10	29	61	..	9	30	57	4	6	25	69	..	5	19	76	..
59.....	14	39	45	1	..	52	43	5	14	44	37	6	6	35	54	4	11	40	45	4	8	45	45	2	10	41	44	5	14	43	41	2	10	43	41	6	7	43	46	4	23	36	41	..
60.....	10	18	70	1	5	33	52	10	7	32	60	1	2	34	59	5	7	28	61	4	7	29	64	..	7	27	63	3	8	31	58	3	10	27	58	5	4	30	65	2	4	24	71	..
61.....	15	50	29	6	23	41	14	23	12	42	27	19	11	53	25	11	18	48	29	5	11	48	25	16	14	50	24	12	19	28	32	21	20	46	22	12	10	50	28	12	9	41	41	9
62.....	11	39	31	19	29	19	19	33	34	39	17	10	33	33	16	18	24	38	23	15	37	33	13	18	21	36	24	19	40	34	14	12	34	42	12	12	27	31	21	21	18	23	36	23
63.....	13	32	48	7	10	24	33	33	14	49	26	12	5	55	33	7	10	40	39	11	14	47	27	12	10	41	36	13	14	41	33	11	14	46	26	14	7	41	39	13	10	45	45	..
64.....	16	42	36	6	10	52	29	10	24	32	34	10	11	40	47	2	15	42	35	8	21	36	41	2	16	41	36	7	21	35	35	9	19	43	30	8	14	38	38	10	9	48	43	..
65.....	16	42	15	28	35	15	15	35	28	41	18	13	18	38	29	16	25	38	15	22	22	42	20	16	24	35	18	23	22	52	13	13	18	49	12	21	30	33	19	18	27	32	14	27
66.....	..	6	72	21	4	11	59	26	4	20	64	12	4	24	60	13	2	18	80	..	5	24	68	3	2	17	80	..	6	23	69	2	4	21	74	1	3	14	80	3	4	19	77	..
67.....	4	27	66	1	5	33	57	5	7	24	67	1	7	24	67	2	4	26	66	4	9	25	66	..	5	26	66	3	6	27	66	1	4	31	64	1	3	19	75	3	19	29	52	..
68.....	18	48	31	3	14	33	43	10	17	38	41	4	15	36	36	13	16	41	38	5	18	39	35	8	17	43	33	7	11	33	43	13	19	29	52	..	16	51	26	7	33	29	19	19

The data of this table offer an opportunity for various observations. With increasing age there was a tendency to attach less significance to Factor 68, "experience in or introduction to literary production." A larger proportion of teachers than of students regarded Factor 65, "emphasis on mental traits as a means of developing attitudes and predispositions," as of no importance. English teachers led all groups in regarding Factor 2, "interest in technicalities of literary craftsmanship," as of no importance. There was general accord in the high rating of importance of Factors 3, 12, 23, 31, 50, 51, 52, and 66.

The third part of the questionnaire concerns the principles involved in learning to appreciate the arts. In the first division of this part 33 principles are listed, to be marked "acceptable" or "not acceptable." This division follows:

Below you will find a list of principles pertaining to learning appreciation of the arts. Will you please indicate your opinion of each principle by putting a plus sign in the blank if acceptable or a minus sign if not acceptable in its present form. If the principle, that is not acceptable as stated, can be made acceptable by a slight change, will you kindly rewrite it in its changed form in the space left for that purpose.

.... 1. The human organism and the situation are the only two variables in the act of appreciation.
.... 2. The fundamental principles involved in the appreciation of all the arts are identical.
.... 3. Appreciation is immediate and emotional rather than intellectual, and therefore it cannot be objectified or easily analyzed.
.... 4. The factors making up the aesthetic reaction are closely related.
.... 5. The stimuli that activate appreciation are not absolute—they change from age to age—from person to person.
.... 6. The basis of literary appreciation is the instinct for beauty.
.... 7. Perception is at the basis of emotions, ideas, and appreciation.
.... 8. Feeling and proper interpretation are dependent upon proper sensory experience.
.... 9. The reactions made in the appreciative act are more emotional than volitional or intellectual.
.... 10. Literary appreciation is a process of reacting that all or most can learn.
.... 11. Aesthetic appreciation is a psychological trait wholly removed from abstract intelligence.
.... 12. Success in most routine art classes carried on in the school does not necessarily reveal the student's ability to appreciate art.
.... 13. Appreciation develops from the practice and exercise of those activities which one must do to acquire real aesthetic experience.
.... 14. Appreciation activities lead to growth in appreciation.
.... 15. The learning processes which result when literary appreciation is developed are not different from other learning processes.
.... 16. The influence of environment imposes limitations on the reactions which make possible that type of learning known as literary appreciation.
.... 17. There is an important relation between artistic appreciation and play.
.... 18. The use of proper materials is a factor in the learning of literary appreciation.
.... 19. Adequate expression as a factor in learning to appreciate.
.... 20. Other things being equal, a multiplicity of channels of expression aids in learning to appreciate.
.... 21. Feelings are more vital and permanent when aroused by sense perceptions and images than when produced by abstract meanings.
.... 22. Attitude, or mental set, is of fundamental importance for learning appreciation.
.... 23. Appreciation is limited to the feeling of pleasure or enjoyment; when more active feelings arise, the attitude is not one of appreciation.
.... 24. Appreciation of any phase of art is dependent upon establishing a sympathetic mood in the learner.

.... 25. Appreciation of beauty raises us above our usual selves—creates a feeling of detachment or a sort of impersonality.

.... 26. Appreciation is a stimulus to certain types of activity and includes the recognition of a personal relationship of the artist (poet) with his thoughts, problems, moods, etc.

.... 27. In appreciation the attitude is more or less passive, overt action being slight or wholly lacking.

.... 28. Immediate attraction of the art situation is the same as aesthetic appreciation of it.

.... 29. Appreciation is determined by the degree to which the reader participates in the particular work of art.

.... 30. Appreciation does not depend entirely upon knowledge about the object or situation appreciated.

.... 31. Appreciation is not dependent on creative skill.

.... 32. Appreciation of literature, and of art in general, is gained by a conscious and specific training towards it and so cannot be assumed as a by-product of the creation of art.

.... 33. Satisfaction with a definite and perceivable amount of gain is essential to the learning of appreciation.

Table III shows the percentage of those responding to the questionnaire who marked each of the above principles as acceptable.

TABLE III. PERCENTAGES OF PERSONS ASSIGNING INDICATED VALUES* TO PRINCIPLES INVOLVED IN LEARNING TO APPRECIATE THE ARTS

	Teaching Field				Sex		Position		Age			
	English	Elementary	Not Known	Miscellaneous	Male	Female	Teacher	Student	18-25	26-35	36 Above	General
1	49	32	51	43	46	46	46	45	43	50	38	44
2	70	60	58	51	41	64	68	57	60	62	76	62
3	54	60	44	52	46	49	46	55	44	51	52	50
4	89	90	78	91	80	87	88	78	80	88	90	87
5	91	81	90	95	95	94	95	92	91	89	100	93
6	60	55	64	55	56	66	62	61	58	69	59	62
7	88	86	84	91	90	79	87	89	88	81	100	88
8	76	68	82	89	91	76	81	79	73	83	86	81
9	66	57	69	74	63	60	67	76	46	69	86	69
10	67	68	52	72	68	64	62	53	56	70	73	63
11	23	04	25	22	33	20	24	24	22	22	50	23
12	96	95	90	96	93	93	96	86	92	93	95	93
13	94	86	81	93	91	89	90	89	97	91	95	89
14	98	90	89	96	93	93	94	92	92	95	100	94
15	82	67	58	62	50	62	60	58	53	63	68	59
16	82	91	83	80	85	83	83	79	86	77	81	84
17	70	42	65	77	77	64	68	70	70	66	68	68
18	94	82	90	95	94	92	94	90	91	96	81	93
19	71	59	74	93	79	68	68	78	72	69	75	72
20	91	95	90	91	92	91	92	91	93	94	86	91

TABLE III—Continued

	Teaching Field				Sex		Position		Age			
	English	Elementary	Not Known	Miscellaneous	Male	Female	Teacher	Student	18-25	26-35	36 Above	General
21	93	89	89	93	91	91	94	82	91	93	86	92
22	97	100	94	98	91	99	98	93	95	97	95	97
23	29	25	20	35	26	25	28	16	24	27	27	24
24	86	83	84	85	77	86	81	83	80	89	91	85
25	79	77	67	79	70	75	71	60	68	78	73	74
26	87	89	73	93	82	85	85	59	84	84	85	85
27	41	23	27	47	38	34	38	33	28	41	45	33
28	26	05	45	41	28	24	23	22	25	30	33	24
29	57	68	68	50	68	57	57	70	67	62	43	61
30	81	95	85	93	89	85	88	84	87	86	86	89
31	85	98	86	82	85	86	86	87	86	86	86	87
32	60	45	51	54	53	53	55	49	51	57	48	54
33	73	66	74	84	71	76	74	75	80	74	62	75

* These are positive values and indicate the percentage of those responding who are in agreement with the principles as stated.

Fifty-nine per cent of the English teachers accepted Principle 4, while 63 per cent accepted Principle 5. Principle 12 offers a good example of agreement of opinion relative to the value of the principles. A high percentage of all respondents accepted Principles 13 and 14. There are marked educational implications from these principles.

The second division of this part of the questionnaire was made up of seven groups, each made up of two alternate principles involved in learning to appreciate the arts. In many cases neither of these was acceptable and a modification was suggested.

The following principles are stated in alternate forms. Check in the blank the one which is most acceptable to you. If neither seems acceptable, please rewrite in the space left for that purpose the principle as you feel it should be stated.

Group I

.... 1. The best means for acquiring appreciation of art is association with a personality that has already learned to appreciate.

.... 2. The best means for acquiring appreciation of art is by association with or reacting to the product.

Group II

.... 3. If art is too idealized and too distant in its appeal to an individual, its influence upon him will be limited.

.... 4. If art deals with incidents of the present day or local interest it is likely to lose the universal character of its appeal.

Group III

.... 5. Good taste in art values is not a native capacity but it is acquired under certain conditions and definite training.

.... 6. Good taste in art values is based on certain natural capacities such as sensory acuity and imagination.

Group IV

.... 7. Appreciation by the common run of men is different in kind and quality from that of the highly sensitive and cultured person.

.... 8. Appreciation by the common run of man is not essentially different in degree and amount from that of the highly sensitive and cultured person.

Group V

.... 9. Appreciation of a literary selection or situation implies grasping the thought of the selection in detail part by part.

.... 10. Appreciation of a literary selection or situation implies grasping the work as a whole.

Group VI

.... 11. The basis of power to appreciate is in the original nature of the learner.

.... 12. Appreciation ability is power developed thru experience and training.

Group VII

.... 13. Considering the elements in an aesthetic situation one at a time destroys some of their aesthetic value. They should be considered in relation to their content.

.... 14. A consideration of the elements one by one in an aesthetic situation is necessary to appreciation of the whole.

The percentage accepting each principle is shown in Table IV.

TABLE IV. PERCENTAGE ACCEPTING EACH PRINCIPLE LISTED IN DIVISION II OF PRINCIPLES INVOLVED IN LEARNING TO APPRECIATE THE ARTS

	Teaching Field				Sex		Position		Age		
	English	Elementary	Not Known	Miscellaneous	Male	Female	Teacher	Student	18-25	26-35	36 Above
1	40	59	53	46	53	39	48	46	46	51	50
2	60	41	47	54	47	61	52	54	54	49	50
3	68	71	70	92	71	76	79	61	66	85	71
4	32	29	30	8	29	24	21	39	34	15	29
5	43	50	53	46	51	48	43	59	54	48	41
6	57	50	47	54	49	52	57	41	46	52	59
7	78	76	78	82	82	79	83	73	84	87	75
8	22	24	22	18	18	21	17	27	16	13	25
9	5	20	8	6	11	7	8	10	9	8	...
10	95	80	92	94	89	93	92	90	91	92	100
11	30	21	30	17	31	23	26	25	27	29	33
12	70	79	70	83	69	77	74	75	73	71	67
13	83	89	75	83	76	82	85	73	77	85	85
14	17	11	25	17	24	18	15	27	23	15	15

Principle 3 is generally accepted and corroborates the findings in experimental studies bearing on interest on the part of the learner as essential to a learning situation. The rejection of Principles 9 and 14 implies a degree of consistency in the judgments. The acceptance of Principle 7 is a variation from the findings previously reported in the study of Dr. Speer.[1]

Summary

There may be conditions and activities other than those set forth here that are essential to learning to appreciate. The results of this investigation show, however, that in the opinion of the group who responded in this study "the mental set or attitude of the learner" is first to be considered. The next consideration is that the "learner perceive a goal or objective"; whereas the last activity to be undertaken so far as its value is concerned is "statements about the material to be appreciated." Ninety-four per cent of the persons who responded regard "comprehension of meaning" of great importance as a factor contributing to learning to appreciate. There is almost the same degree of unanimity in regard to "knowledge or interest in technicalities of literary craftsmanship" as of almost no importance for such learning. This conclusion raises the question asked by Dr. Dora V. Smith,[2] in her recent survey of the English curricula of the secondary schools of the United States, as to why our courses of study call for so much attention to the technical craftsmanship of the study of English when what we desire is that the youth so trained shall read and read widely for enjoyment. "The learner's ability to get word pictures" is regarded as of great importance as also is the "emotional attitude associated with his experiences."

There is general agreement that an appeal must be made to interest and that the character of the initial presentation is highly important as a factor contributing to learning to appreciate a literary work. The following principles are generally accepted as basic for learning to appreciate the arts.

Division I:

The factors making up the aesthetic reaction are closely related.

The stimuli that activate appreciation are not absolute—they change from age to age—from person to person.

Perception is at the basis of emotions, ideas, and appreciation.

Appreciation develops from the practice and exercise of those activities which one must do to acquire real aesthetic experience.

Appreciation activities lead to growth in appreciation.

Division II:

If art is too idealized and too distant in its appeal to an individual, its influence upon him will be limited.

[1] Speer, Robert K. *Measurement of Appreciation in Poetry, Prose and Art, and Studies in Appreciation.* Columbia University, Teachers College, Contributions to Education, no. 362, New York, 1929. 77 pp.

[2] Smith, Dora V. *Instruction in English in Secondary Schools.* National Survey of Secondary Education, Monograph 20, Washington, D. C. 1932.

Appreciation of a literary work or situation implies grasping the work as a whole.

Appreciation ability is power developed thru experience and training.

Considering the elements in an aesthetic situation one at a time destroys some of their aesthetic value. They should be considered in relation to their content.

Conclusions and Suggestions

What then are some of the suggested values accruing from this study?

1. There has been a contribution in summarizing the studies in this field and in showing the relation of this one to them.

2. The analysis of the factors which contribute to the appreciative response constitutes a contribution that has never been made.

3. In developing an evaluation of these factors, a few of the factors subjected to judgments were so uniformly accepted that, until other analyses are available, it would be worth while to consider these as subjects for experimentation.

The conclusions applicable in a practical program are, in the main, as follows:

1. Since appreciation develops from the practice and exercise of those activities which one must do to acquire real aesthetic experience, it follows that individuals at all levels are able to learn to appreciate the arts to some degree.

2. To insure the greatest economy in learning, the materials presented should be within the range of comprehension of the learner.

3. A principle of importance in learning to appreciate literature is that the approach shall create a degree of anticipatory interest and stimulate to further activity.

This study has revealed certain related problems for further study. The purpose of the rating of factors is to make a selection of those that, on the basis of judgment and consensus of opinion, are probably the most significant in learning to appreciate. Factors thus selected form a basis for directing experimental and scientific work for the ultimate determination of the value of these factors in this regard. A determination of the relative importance of a factor, subjectively set by a group, promises a basis for experimentation. This method is intended to avoid the necessity for random experimentation, with the idea of converging future experimental effort in this line within the most probable limits that would justify a reasonable expectation of satisfactory findings with a minimum cost. Further investigation would concern itself with an experimental study of those activities regarded as functioning fundamentally for this type of learning.

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Special Disability in Reading and Arithmetic

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THE problem of special disability, or unevenness in abilities, was studied by selecting for comparison two abilities which are quite unlike, namely, reading and arithmetic. The term "unevenness in abilities" is used in this paper to indicate the situation in which a person is better in one of these abilities than in the other. The study was carried on with freshmen at Ball State Teachers College, and supplemented with case studies of school children.

Unevenness of Abilities in Reading and Arithmetic Among the Freshmen of a State Teachers College

The subjects for the study of teachers college freshmen consisted of all freshmen who entered the Ball State Teachers College at Muncie, Indiana, from October, 1927, to May, 1931. There were 1,717 freshmen included. The records of negroes and foreign-born students were excluded. Results were used from two kinds of tests, a test of reading and a test of problem-solving in arithmetic. Different tests were used in different years, as follows:

1927-28. Ohio State University Psychological Test—Part 1, Arithmetic Problems; Part 5, Reading.

1928-29. Psychological Examination of the American Council on Education (1928 edition)—Test 4, Arithmetic; Thorndike-McCall Reading Scale, Form 8.

1929-30. Same as 1928-29, except that Form 7 of the Thorndike-McCall Reading Scale was used in place of Form 8.

1930-31. Psychological Examination of the American Council on Education (1930 edition)—Test 4 Arithmetic; Nelson-Denny Reading Test, Form A.

The data for each year were treated separately. Each freshman's scores were turned into standard scores, and the reading score was subtracted from the arithmetic score. The sign of the difference was disregarded. This difference was called *d* of d-score, and is a measure of unevenness, i.e., of the extent to which one ability is superior to the other.

It was found that freshmen who came from broken homes were more uneven in their abilities than those who came from normal homes. The term "broken home" was used to denote families where the parents were separated, where either or both parents were dead, or where the mother was working outside the home.

An interview was held with each of the college freshmen, still in college, who came from a broken home. Questionnaires were sent to

those who had left college. In five cases information was secured from a sibling. Interviews were held with 130 women and 41 men. Questionnaires were sent to 84 women and 50 men, and replies were received from 71 women and 30 men.

In the interviews, questions were asked about the student's dislike for any particular school subject, and about difficulties in learning which had been met at any time. The student was also questioned about his family, the time when it was broken up, and the relation of the student to the missing parent. The questionnaires also contained questions about the student's dislike for, or difficulty with, school work, and about the breaking up of the home.

Tables I, II, III, and IV show the d-scores (measures of unevenness) of the college freshmen, separated according to sex and according to type of home. The d-scores of certain students are excluded from these tables, viz., cases where the home was broken up before the child began school, or after he had finished high school. In Table V the means of the groups from broken homes are compared with the means of the groups from normal homes, and in Table VI the standard deviations of the various groups are brought together for a similar comparison.

TABLE I. D-SCORES OF WOMEN FROM BROKEN HOMES

D-Score	Year of College Entrance			
	1927-28	1928-29	1929-30	1930-31
3.3—3.5	..	..	..	1
3.0—3.2	1	1	..	0
2.7—2.9	0	0	..	0
2.4—2.6	2	4	1	1
2.1—2.3	2	0	2	2
1.8—2.0	4	4	4	3
1.5—1.7	9	5	7	1
1.2—1.4	3	11	4	7
.9—1.1	6	7	4	10
.6— .8	5	7	3	0
.3— .5	9	6	0	6
.0— .2	4	7	5	2
N	45	52	31	33
Mean	1.15± .077	1.10± .066	1.24± .079	1.21± .083
SD	.766± .054	.705± .047	.655± .056	.706± .059

TABLE II. D-SCORES OF MEN FROM BROKEN HOMES

D-Score	Year of College Entrance			
	1927-28	1928-29	1929-30	1930-31
2.4—2.6	1	2	..	..
2.1—2.3	0	0	..	..
1.8—2.0	0	1	..	1
1.5—1.7	3	2	1	4
1.2—1.4	1	1	0	0
.9—1.1	1	3	2	2
.6— .8	4	1	4	1
.3— .5	2	4	2	1
.0— .2	2	4	1	4
N	14	18	10	13
Mean	.91± .108	.97± .118	.73± .094	.90± .123
SD	.598± .076	.740± .083	.443± .067	.656± .089

TABLE III. D-SCORES OF WOMEN FROM NORMAL HOMES

D-Score	Year of College Entrance			
	1927-28	1928-29	1929-30	1930-31
3.6—3.8	1	..	..	..
3.3—3.5	0	..	1	1
3.0—3.2	1	..	1	1
2.7—2.9	2	1	0	0
2.4—2.6	7	4	2	5
2.1—2.3	6	3	3	7
1.8—2.0	10	8	12	8
1.5—1.7	14	18	12	10
1.2—1.4	26	28	15	21
.9—1.1	39	30	35	24
.6— .8	59	45	39	46
.3— .5	60	47	43	45
.0— .2	57	44	43	59
N	282	228	206	227
Mean	.81± .026	.81± .026	.84± .029	.81± .030
SD	.65± .018	.59± .018	.62± .021	.66± .021

TABLE IV. D-SCORES OF MEN FROM NORMAL HOMES

D-Score	Year of College Entrance			
	1927-28	1928-29	1929-30	1930-31
3.0—3.2	..	2	..	2
2.7—2.9	3	0	1	5
2.4—2.6	1	4	0	1
2.1—2.3	5	6	5	8
1.8—2.0	6	8	4	8
1.5—1.7	10	10	8	6
1.2—1.4	13	9	8	5
.9—1.1	20	19	21	11
.6— .8	18	13	16	15
.3— .5	38	24	24	23
.0— .2	20	21	16	14
N	134	116	103	98
Mean	.87 ± .038	.97 ± .061	.90 ± .044	1.11 ± .057
SD	.66 ± .027	.74 ± .043	.61 ± .031	.84 ± .040

TABLE V. COMPARISON OF MEAN D-SCORES OF SUBJECTS FROM NORMAL HOMES AND SUBJECTS FROM BROKEN HOMES

Group	Means, Broken Homes	Means, Normal Homes	Difference of Means	Ratio of Difference to its PE
Women—				
1927-28	1.15 ± .077	.81 ± .026	.36 ± .080	4.5
1928-29	1.10 ± .066	.81 ± .026	.29 ± .071	4.1
1929-30	1.24 ± .079	.84 ± .029	.40 ± .084	4.8
1930-31	1.21 ± .083	.81 ± .030	.40 ± .088	4.5
Men—				
1927-28	.91 ± .108	.87 ± .038	.04 ± .114	0.4
1928-29	.97 ± .118	.97 ± .061	.00 ± .133	0.0
1929-30	.73 ± .094	.90 ± .044	.17 ± .104	1.6
1930-31	.90 ± .123	1.11 ± .024	.21 ± .125	1.7

From Table V it appears that women who come from broken homes show more unevenness of abilities than women from normal homes. The difference is statistically reliable for each group. The difference is shown consistently each year. The textbooks on statistics set up the criterion that the difference between two means must be at least four times as large as its own probable error in order to be regarded as reliable. For the women, this criterion is met for each of the four years. It is safe to conclude that there is a genuine difference between women from broken homes and women from normal homes.

Another way of comparing the women from normal homes with the women from broken homes is to compare the distributions with respect to dispersion. For this comparison, the standard deviations of the d-scores for the various groups have been brought together in Table VI. When the women from normal homes are compared with the women from broken homes with respect to the standard deviations of the d-scores, it is seen that the differences are small. The largest one is .12 with a probable error of .05. Since this difference is only 2.4 times as large as its probable error, it is not reliable. The other differences are all small in relation to their own probable errors. These differences are therefore to be regarded as probably due to sampling errors. The conclusion is that the distributions are not reliably different with respect to dispersion. This means that the difference between the means, which was discussed in the preceding paragraph, is not due to a few extremely high d-scores among the women from broken homes. Instead, the trait "unevenness" should be thought of as occurring among women from broken homes in greater degree than among women from normal homes.

TABLE VI. COMPARISON OF STANDARD DEVIATIONS OF D-SCORES OF SUBJECTS FROM NORMAL HOMES AND SUBJECTS FROM BROKEN HOMES

Group	Standard Deviations, Broken Homes	Standard Deviations, Normal Homes	Difference	Ratio of Difference to its PE
Women—				
1927-28	.76±.054	.65±.018	.11±.056	2.0
1928-29	.71±.047	.59±.018	.12±.050	2.4
1929-30	.66±.056	.62±.021	.04±.060	0.7
1930-31	.71±.059	.66±.021	.05±.063	0.8
Men—				
1927-28	.78±.099	.66±.027	.12±.104	1.2
1928-29	.80±.093	.74±.043	.06±.101	0.6
1929-30	.44±.067	.61±.031	.17±.074	2.3
1930-31	.66±.089	.84±.040	.18±.098	1.8

When the men from broken homes are compared with the men from normal homes (Table V and Table VI), it is seen that the men from normal homes show more unevenness than the men from broken homes.

However, the differences are not statistically reliable. The number of cases is too small to permit any conclusions.

There were 30 women and 11 men whose homes were broken up before they began to go to school, and who did not experience any further marked change in the family situation during their school careers. These cases were excluded from Tables I and II. The d-scores of these cases were considerably lower, on the whole, than the d-scores of the students whose homes were broken up while they were attending school. For the 30 women, the d-scores ranged from .1 to 2.1, with a mean of .64. This mean is considerably lower than the means for the women from normal homes, which are given in Table III, and which range from .81 to .84. Of the 30 women whose homes were broken up before they entered the first grade, only seven have d-scores above .8, that is, above the mean for women from normal homes, and only two have d-scores which are above 1.0.

The men whose homes were broken up before they entered Grade I number 11, with d-scores ranging from .1 to .8. All have d-scores below the mean for men from normal homes.

There were 9 freshmen whose homes were broken up after they had finished high school—7 women and 2 men. The d-scores for the women range from 0 to .9, with a mean of .5. The d-scores for the 2 men in this group are 1.3 and .7. These d-scores are all small.

It is evident that college freshmen who come from broken homes, but whose homes were broken up before they started to go to school or after they finished high school, do not differ from college freshmen who come from normal homes with respect to the trait "unevenness." The conclusion seems to be that unusual unevenness is not associated with the fact of living in a broken home, but rather with the experience of having the home broken up while learning is going on. This fact also makes it seem improbable that excessive unevenness, as it has been measured in this study, is associated with any hereditary factor.

It was found, in interviewing college students, that many students were fully aware of the fact that one ability was inferior to the other, and that many of them could set a definite time for the beginning of the inferiority. The descriptions given by the students took various forms. Some said that they hated arithmetic, or had a very strong dislike for it. Others professed to have no dislike for arithmetic, but had found it hard to learn compared with other studies. With respect to reading, similar accounts were given. It was found that many students whose reading ability was inferior gave accounts of dislike for, or difficulty with, geography, literature, history, or science. As these studies involve reading, such accounts were taken to mean difficulty with reading.

Similar reports were found in the questionnaires. In many cases the student's account showed that his dislike for, or difficulty with, one of the school subjects began soon after the home was broken up. A count was made of such cases and the result is shown in Table VII. In making up this table, certain cases were excluded from consideration. The cases excluded were those where the change in the family occurred before the child had begun school, or after the child had finished the twelfth grade.

The point at issue is: Did a significant proportion of the college students from broken homes report a special difficulty or a special dislike for reading or for arithmetic which began soon after a major change in the family situation? A major change in the family situation means the loss of one or both parents by death or by separation, the mother beginning to work outside the home, the entrance of a step-parent into the home,

TABLE VII. NUMBER OF CASES IN WHICH A SPECIAL DIFFICULTY WITH SOME SCHOOL STUDY APPEARED SOON AFTER A MAJOR CHANGE IN THE FAMILY

Group	Number of Students Who Experienced a Major Change in the Family While in Grades I-XII	Number Who Reported a Special Difficulty in School Work at the Time of the Change in the Family	Per Cent so Reporting
Women—			
1927-28	46	19	41
1928-29	48	16	33
1929-30	30	13	43
1930-31	32	13	41
Men—			
1927-28	15	6	40
1928-29	14	7	50
1929-30	8	3	38
1930-31	13	4	31
All women	156	61	39
All men	50	20	40
Total	206	81	39

or the separation of the child from a foster-parent. Difficulty with reading is interpreted to include difficulty with history or geography, as these studies are dependent largely upon the use of books, and in many schools children are encouraged to read widely in connection with these studies. "Soon after" means within a year, that is, during the same semester or the next following semester.

One characteristic of Table VII is the uniformity of the percentages in the last column. The range is from 31 to 50, while 5 of the 8 percentages fall between 38 and 43. This uniformity is surprising, in view of the small numbers in some of the groups. With respect to the facts of Table VII, men do not differ from women.

This table, however, does not tell the whole story. Many of the subjects have passed thru more than one major change in the family situation. The total number of such changes, for the 206 cases in Table VII, is 276. There were, therefore, 276 chances for a student to report that he had met some special difficulty in learning soon after

a change in the family. Eighty-one such reports were given, or 29.3 per cent of 276.

Since there are twelve school years under consideration, a report of the kind counted in Table VII would by chance occur in one-twelfth of the cases, or 8.3 per cent. This theoretical chance percentage is to be compared with the observed percentage of 29.3 per cent. The probable errors of these percentages, when N is 276, were computed. For 8.3 per cent, the probable error is .011; for 29.3 per cent, the probable error is .018. The difference between these percentages is .210, with a probable error of .021. This difference is ten times as great as its own probable error. The conclusion is that the observed percentage is certainly reliable and cannot be due to fluctuations of sampling. It is safe to conclude that there is a genuine tendency for college students who come from broken homes to report that they met some difficulty in either reading or arithmetic soon after a major change in the family situation.

The percentages in Table VII seem high, when it is considered that the reports of the students concerning their difficulties in school must have been affected by many accidents of memory. Furthermore, it must be remembered that only two school subjects, reading and arithmetic, were considered, and that no information was given about disabilities which may have occurred in other school subjects. The consistency of the percentages from year to year also lends weight to any conclusion which may be drawn from Table VII. The conclusion seems justified that in a good many cases a child's dislike for reading or arithmetic, or a special difficulty with one of these subjects, begins shortly after the child's home has been broken up. This conclusion is true for men as well as for women.

In this section of the paper facts have been presented concerning the trait "unevenness" among the freshmen of a state teachers college. Unevenness was measured by comparing the score on an arithmetic test with the score on a reading test. The conclusions are:

1. A concomitant of unevenness in abilities is the experience of having the home broken up. This is true (*a*) for women but probably not for men, and (*b*) only for women whose homes are broken up while they are attending the elementary school or the high school.

2. Many college students who come from broken homes set a definite date for the beginning of their difficulties with some particular school subject. This beginning often follows closely after the date of the breaking up of the home. This is true for both men and women.

Case Studies of Children from Broken Homes

Case studies were made of 19 children who were living in broken homes. These children were found by visiting ten schools in Muncie, Indiana. Children were selected for study whose homes had been broken up within the last two years, whose school records showed results of standard achievement tests covering a period before and after the breaking up of the home, who did not show any unusual physical defect, and

who had attended the Muncie schools for at least three years before the home was broken up.

There were 7 boys and 12 girls among the 19 cases selected for study. The range of ages at the time of the breaking up of the home was from 9 to 14. In economic and social status there is a wide range, the father's occupation ranging from professional work to unskilled labor. There is also a wide range of intellectual capacity, as shown by intelligence tests, with I.Q's ranging from 80 to 140. The group is not a selected one in any sense, except that all are living in broken homes. In other respects they constitute a fair sample of the general population.

A variety of broken homes is found among these 19 cases representing 17 homes, as there are two pairs of siblings. There are 9 children living in homes where the father is separated from the family, 4 in homes where the father is dead, 4 in homes where the mother is dead, and 2 in homes where the mother works away from home during the day.

Each child was interviewed two or three times. The subjects were encouraged to talk freely about difficulties that had been met in school work, about likes or dislikes for any particular studies or teachers, and about conditions at home which seemed to have a bearing on school work. The children were usually frank and coöperative, and talked without reserve. A set procedure was not followed, and a fixed list of questions was not used, as it seemed better to encourage the child to talk freely, and to follow up, by appropriate questions, any suggestions given by the child.

Three cases will be reported in detail, sixteen others will be summarized briefly.

Case 1 is Charles, whose family is broken up by the absence of the father. The father works in a nearby town, and is home only for a few hours on every other Sunday. He began to work away from home in August, 1930, when Charles was 12 years and 6 months old.

Charles has attended the same school all his life, and has been promoted regularly. His I.Q. is 109 on the Stanford-Binet test. Two group tests of intelligence given at different times have given I.Q.'s of 96 and 108 respectively. The school record shows nothing unusual.

School records give the scores on standard tests for the school years 1928-29, 1930-31, and 1931-32. The record for the year 1929-30 is lost. In 1928-29 the tests used were the Woody-McCall Mixed Fundamentals (computing) and the Thorndike-McCall Reading Scale. In 1930-31-32, the New Stanford Achievement Test was used; the scores for Part 1, paragraph meaning, and Part 10, arithmetic computation, are reported here. By comparison with the author's norms, the scores were transmuted into grade standings. The results of these tests are shown in Table VIII.

TABLE VIII. SCORES ON STANDARD ACHIEVEMENT TESTS, CASE 1

Date	Grade Standing		Difference
	Computing	Reading	
Normal home—			
September, 1928	3.9	4.5	−.6
January, 1929	5.5	5.2	+.3
May, 1929	6.4	6.3	+.1
Mean	...	...	−.1
Broken home—			
September, 1930	5.9	7.5	−1.6
January, 1931	7.2	9.5	−2.3
May, 1931	7.1	10.0	−2.9
September, 1931	6.0	9.7	−3.7
January, 1932	6.0	10.1	−4.1
Mean	...	....	−2.9

In the column showing differences, the reading score was subtracted from the arithmetic score. Hence a plus sign means that arithmetic is the better ability, while a minus sign means that reading is better. In averaging these differences, or measures of unevenness, the signs were considered.

These tests showed that in the year 1928-29 Charles made scores which were fairly good for his grade. He was then in Grade 5. One ability was just about as good as another, and the differences shown in the last column of Table VIII are small. Charles was living in a normal home at that time.

After August, 1930, a different situation existed. From this time on Charles made good scores in reading and poor scores in computing. It was during this time that his father was away from home. Charles made rapid improvement in reading, and made scores well above the norms for his grade, while his computing ability showed no consistent improvement for a year a half.

Circumstances prevented an inquiry into Charles's family relationships; nothing was found to explain why Charles's learning should be interrupted while the father was absent.

Case Number 2 is Mary, who is living with her mother. The father left the family on September 9, 1929, when Mary was 10 years and 2 months old. This girl has been tested with two forms of the National Intelligence Test, which yielded I.Q.'s of 96 and 110 respectively. The school record shows nothing unusual, and confirms the I.Q. of about average. Mary was in Grade 6 when this study was made, and had been in the same school for four years. Records show scores on the standard tests for each of these four years. The tests used in 1928-29-30 were the Woody-McCall Mixed Fundamentals in computing and the Thorndike-McCall Reading Scale in reading. In 1930-31-32 the test used was the New Stanford Achievement Test. The record of standard tests covers one year when Mary was living in a normal home, and three years when she

was living in a broken home. The scores on standard tests, transmuted into grade standings, are shown in Table IX.

It is evident that Mary was fairly even in her abilities while living in a normal home. After the home was broken up, there was a change. Considerable unevenness appeared, because of a loss in reading ability during the year immediately after the separation of Mary's parents. By January, 1931, the unevenness was marked and for a year and a half thereafter it continued to be so.

When Mary was interviewed, she said that her favorite study was mathematics, and that she disliked English and geography. English, she thought, was not difficult, but she disliked it nevertheless. Geography seemed both difficult and uninteresting. These are the studies in which most reading is required in her school. Her dislikes are related to her mediocre ability in reading.

When asked to tell about the parent's interests and leisure time pursuits, Mary stated that her mother very seldom engaged in reading, but that her father sometimes did. Her father had no use for arithmetic in his vocation and had never helped Mary with it. Mary's ideas about arithmetic were associated with her mother. She thought that the mother made considerable use of arithmetic in buying for the household, estimating expenses, and keeping accounts. However, the mother never helped Mary with her school work.

TABLE IX. SCORES ON STANDARD TESTS, CASE 2

Date	Grade Standing		Difference
	Computing	Reading	
Normal home—			
September, 1928	3.3	3.9	−.6
May, 1929	5.0	4.7	+.3
Mean	....	...	−.2
Broken home—			
November, 1929	5.7	4.1	+1.6
March, 1930	7.2	5.7	+1.5
January, 1931	8.1	6.1	+2.0
May, 1931	10.7	7.9	+2.8
September, 1931	10.2	8.2	+2.0
January, 1932	10.9	9.8	+1.1
May, 1932	11.0	8.4	+2.6
Mean	....	...	+1.9

To this child, the father seemed to be the parent who was interested in reading, while the mother seemed to be interested in arithmetic. This is in harmony with the fact that after the father had left the household, the child made slow progress in reading.

The two cases which have been described are typical. Ten more case studies were made with similar findings and the essential facts from these case studies are shown in Table X, Cases 3 to 12.

Three cases differed somewhat from the two which have been described. In each of these cases, the child showed considerable unevenness before the home was broken up, and still greater unevenness afterward. However, the direction of unevenness was reversed, and the ability which was superior before the disruption of the family became the inferior ability afterward. The data for these cases appear in Table X, Cases 13 to 15.

TABLE X. CHANGES IN UNEVENNESS, CHILDREN IN BROKEN HOMES*

Case Number	Normal Home		Broken Home	
	Number of Tests	Mean Unevenness	Number of Tests	Mean Unevenness
1	3	−.1	5	−2.9
2	2	−.2	7	+1.9
3	4	+.6	2	+1.4
4	3	−.1	2	+.6
5	1	+.1	3	+.7
6	2	−.1	5	−.8
7	1	+.1	3	−1.4
8	1	0	4	−2.6
9	2	−.4	3	−2.1
10	3	−.4	2	−1.2
11	4	−.6	3	−2.2
12	2	−1.6	5	−4.2
13	2	−3.7	4	+2.1
14	2	−1.2	7	+1.3
15	3	−1.8	3	+.9

* In this table, unevenness is measured by the difference between a score on an arithmetic test and a score on a reading test. A positive measure means that arithmetic is the better, while a negative measure means that reading is the better. The unit used is the difference between the norms for two successive grades.

Four children were found who were temporarily separated from one parent. In each of these cases, a period of unevenness in abilities corresponded to the period of separation from the parent. After the child was again associated with the parent, the unevenness disappeared. One of these cases (Case 16) will be described in detail. The others will be reported more briefly.

Case 16 is a girl, Lucille, who was studied in May, 1932. She was 11 years and one month old at that time, and was enrolled in Grade 6.

Her mother worked in a factory for a time, so that it is possible to study this girl's performance at three different periods. In the first period the family situation was normal, in the second period the mother was working outside of the home, and in the third period the mother had quit work and the home was again normal. The mother started working in a factory in August, 1930, and worked steadily until December, 1931.

Lucille's intelligence has been measured by the National Intelligence Scale, Scale A, Form 1. This yielded an I.Q. of 107. This I.Q. is confirmed by the school record.

Scores on achievement tests are shown in Table XI. This table shows that Lucille was very even in her abilities during the period when her mother was not working. Good progress was made in both computing and reading, and both abilities stood at the same level. Soon after her mother started working, marked unevenness appeared, persisted until the mother stopped working, and disappeared when normal home conditions were restored. The changes from evenness to unevenness and back to evenness again are abrupt.

TABLE XI. SCORES ON STANDARD TESTS, CASE 16

Date	Grade Standing		Difference
	Computing	Reading	
Normal home—			
May, 1929	3.6	3.8	− .2
November, 1929	4.1	4.2	− .1
March, 1930	4.9	4.8	+ .1
September, 1930	5.1	5.2	− .1
Mean	...	...	− .1
Broken home—			
January, 1931	6.1	4.3	+1.8
May, 1931	6.3	4.6	+1.7
September, 1931	6.6	5.6	+1.0
Mean	...	...	+1.5
Normal home—			
January, 1932	6.4	6.3	+ .1

When questioned with respect to her likes and dislikes, Lucille said that history was the only study for which she felt an actual dislike. She thought that this dislike had begun while she was in Grade 4A. This is the grade in which she began to make low scores on reading tests. She reported that she habitually turned to her mother for help in reading, and to her father for help in arithmetic. This may explain why her reading ability declined while her mother was working.

Three other cases were found which were similar to Case 16. In each case the child displayed considerable unevenness while separated from a parent, but this unevenness disappeared and the child became even in his abilities when he was again associated with both parents.

Case 17 was a girl who, while living with her father, was fairly even in abilities, with unevenness scores of —.1 and +.5 at two testing periods. Her father left the household for a year and a half. At the beginning of the period of separation the child's computing ability

reached the norm for Grade 4.8, while reading ability reached the norm for Grade 4.4. A year and a half later, computing ability still stood at 4.8, while reading ability had increased to 6.4, that is, considerable unevenness had appeared. Her father then rejoined the family, and soon after the two abilities stood at 6.0 and 6.3 respectively, showing very little unevenness. This girl thought of her father as the arithmetician of the family, but received no direct help from him.

Cases 18 and 19 are two brothers. Their abilities were very even while they were living in a normal home. The father deserted the family, and unevenness appeared in the records of both boys, with arithmetic as the inferior ability. In Case 18, the mean unevenness, measured by three tests at different times, was +.1, while he was living in a normal home. Three months after the separation from the father, a computing test showed ability typical of Grade 6.4, while reading ability reached the norm for Grade 7.8, a considerable degree of unevenness. Soon after these tests were given, the boy began to see his father daily, going to the father's shop to work on afternoons and Saturdays. While he was thus closely associated with the father, tests showed computing ability of 7.1, and reading ability of 7.0, or unevenness which was nearly zero.

Case 19 shows a similar record. While the home was normal this boy was tested twice, with unevenness averaging —.2, in terms of grade norms. After the disruption of the home, reading ability reached the norm for Grade 7.5, while computing ability barely reached the norm for Grade 6, and the unevenness amounted to 1.5 grades. This boy, like his brother, then formed the habit of going to his father's shop daily. Tested twice after this habit was formed, it was found that the unevenness was +.1 at one testing, and —.5 at another.

The two brothers stated that the father never read anything, but that he used arithmetic a great deal in his shop (an auto repair shop). They thought that the mother was quite lacking in arithmetical ability, but that she read a great deal. The boys' ideas about the father are in harmony with the fact that their computing ability declined when they were kept away from him.

Summary and Conclusions

The study of nineteen children who lived in broken homes shows clearly that unevenness appears soon after the disruption of the family and increases gradually. When the children gave accounts of their experiences at home, it was found that a differential association between parents and school subjects had been set up, such that one parent seemed to the child to be the exemplar and stimulator of arithmetic, while the other served a similar rôle with respect to reading. Sixteen children were questioned on the point, and ten gave evidence of such a differential association. Each of the ten made little or no progress, after the disruption of the home, in the ability which was associated with the missing parent.

The following conclusions seem justified by the study of college freshmen and of school children:

1. When unevenness of abilities is measured by comparing arithmetic ability with reading ability, those who live in broken homes are more uneven than those who live in normal homes.
2. Unevenness in abilities begins soon after the home is broken up.
3. There is some evidence that children think of one parent as the arithmetician and of the other as the reader, but this point needs further study.

The Story of School Sites

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IN the discussion of school sites there are four important considerations: First, the accessibility of the site; second, the environment of the site and its landscaping possibilities; third, the healthfulness of the site, especially with regard to drainage; and fourth, the size, form, and equipment of the site. It is the purpose of this paper to trace the historical development in America of the principles and standards with respect to each of these four essential considerations as it is reflected by the literature dealing with school sites.

Very little was written on the subject of school sites during the period previous to 1830. In the New England states, where the town system of government had prevailed from the earliest times, the sites were selected by the people of the town at an assembly of all the people. The site was not for a school building alone, however, but for a town meeting place as well. Most of the early school buildings were meeting houses where all the affairs of the community were settled—civic, religious, and educational. In other sections of the East, the first schools were held in churches with the minister as schoolmaster. The site, in such cases, was determined by the location of the church. In the rural districts a spot of ground was cleared and the schoolhouse erected by the parents of the children who were to attend. If one could be found, a deserted log cabin was appropriated for the use of the school. In villages and towns the first schools were often held in the home of the master. Sometimes the selection of the master depended upon his ability to provide room in his house for the school.

Thruout the period previous to 1830, where special provisions were made for schools aside from private homes, churches, or public meeting places, schools were located as near as possible to the geographical center of the district to be served, whether in rural districts or in the city. Sometimes, however, the centrality of the site was somewhat disturbed by the donation, for school purposes, of a lot located at some distance from the geographical center of the district. The school trustees, with even less funds comparatively speaking than are available in 1933, gladly accepted the donation of the parcel of ground and erected the school building thereon. Of course, in many instances, the donated plots of ground were worthless to the donor and for the same reasons equally worthless as school sites.

The first discovered discussion of school sites, found in a description of the common school system of Connecticut in 1831,[1] insists upon the

[1] *Barnard's Journal of Education.* "History of Common Schools in Connecticut." *Barnard's Journal of Education* 5:143-4, June, 1858.

proper environment for school sites but implies that, if possible, they should be in the center of the district. Mann, in 1837,[2] definitely stated that sites ought to be in the geographical center of the district. Barnard, in lectures delivered to the schools of Connecticut in the following year,[3] recognized that because of environmental conditions it was sometimes necessary to choose locations a little removed from the geographical center.

The beginnings of the system of graded schools perhaps influenced Mann to propose what was destined to be a new factor in the accessibility of school sites. In his 1837 report,[4] he set up a proposed organization which required the location of a school for children under the age of eight or ten, in the center of a square containing four square miles, and, for children over the age of eight or ten, in the center of a square containing sixteen square miles. This proposal, defining the travel distances of children attending rural schools, was advocated with variations by Potter and Emerson in 1842,[5] by the State Superintendent of Ohio in 1851,[6] and again in 1854,[7] and by the State Superintendent of Indiana in 1875[8]; and then, with graded schools becoming common, it disappeared from the literature for a period of over forty years, to be revived again with the consolidation of rural schools and the establishment of standards for city schools.

A series of investigations of school conditions made and published in the period from 1837 to 1847 in Massachusetts, Connecticut, Vermont, Rhode Island, Michigan, and New Hampshire, revealed and emphasized the inadequateness of school sites, directed attention to the undesirable features of existing locations thru descriptions of poorly situated schools, and led Barnard to publish and broadcast his work on school architecture.[9] So far as the accessibility of the site is concerned, Barnard did not add any new developments; he took the criticisms found in the state surveys and translated them into positive statements of principles which included the following: That the location should be accessible from all parts of the district served; that certain environmental factors should take precedence over centrality, accessibility, or cheapness of site; that in villages a rear lot with access from two or more streets should be preferred; and that in cities high school buildings should be located as centrally as possible.

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[2] Mann, Horace. "Supplementary Report on the Subject of Schoolhouses." *Life and Works of Horace Mann*, vol. 2, pp. 433-89. Lee and Shepard, Boston, 1891.

[3] Brubacher, John S. "School Buildings." *Henry Barnard on Education*, pp. 223-4. McGraw-Hill Book Co., Inc., New York, 1931.

[4] Mann, *op. cit.*, pp. 433-89.

[5] Potter, Alonzo and Emerson, George B. *The School and the Schoolmaster*, pp. 211-18. Harper and Bros., New York, 1842.

[6] State of Ohio. *Annual Report of the Secretary of State on the Condition of Common Schools to the Fiftieth General Assembly of the State of Ohio for the Year 1851*, p. 131. S. Medary, Columbus, 1852.

[7] State of Ohio. *Annual Report of the State Commissioner of Common Schools to the Governor of the State of Ohio for the Year 1854*, pp. 45-7. Statesman Steam Press, Columbus, 1855.

[8] State of Indiana. *Twenty-fourth Report of the Superintendent of Public Instruction of the State of Indiana, 1875-76*, pp. 93-4. Sentinel Co., Indianapolis, 1876.

[9] Barnard, Henry. *School Architecture*. Charles B. Norton, New York City, 1854. 464 pp.

The first real contribution to the literature on the accessibility of school sites was made by Burrowes in a volume entitled *Pennsylvania School Architecture*,[10] published in 1855. This work not only summarized all the principles which had been developed up to this date but added several new principles, among which was the statement that it was not the territory that was to be served but the children in that territory and that therefore the geographical center should be secondary to the center of population. Burrowes also pointed out, for the first time, that there was a difference between centrality of location and accessibility of the site; that streams or mountains, natural barriers, might cause children, only a short distance from the school in a direct line, to travel several miles to reach the school; and that such natural barriers should be considered in the selection of the original site. Of course, Barnard might have implied that natural barriers were considered when he stated that the location should be accessible to all parts of the district but he did not so state. Burrowes also suggests that the school should be so located that access to it would not require or encourage trespass on private property. For city school sites, Burrowes recommends that if a divisioning of the town is necessary the main street should become the boundary line of the districts, or if there is a railway traversing the town the necessity of children crossing it except on a bridge or under the track ought to be dispensed with.

Among the important things to be considered in site selection, Wickersham in 1864[11] lists convenience of access and states that schoolhouses "should be located to furnish the best accommodations to the greatest number without injustice to any," and that sites should be "located so that the least possible distance must be travelled by all children." Three factors are considered as influencing the accessibility of the site: distribution of population, direction of roads, and intervention of obstacles. The size of the district, according to Wickersham, ought to be determined by the number of children necessary for a good school, fifty being the maximum number except in thinly populated districts where the number should be smaller.

The State Superintendent of Ohio, in his 1869 report,[12] after repeating what has already been said about routes of travel and trespass on private property, introduced the suggestion that a point somewhere between the center of population and the geographical center would be a proper location for the school site.

The Indiana State Superintendent, in his 1875-76 report[13] called attention to the fact that the condition of the roads might be just as important as their direction and location. For the first time there was

[10] Burrowes, Thomas H. *Pennsylvania School Architecture*, pp. 20-8, 237. (A Manual of Directions and Plans for Grading, Locating, Constructing, Heating, Ventilating, and Furnishing Common School Houses.) A. Boyd Hamilton, Harrisburg, 1855.

[11] Wickersham, James Pyle. *School Economy*, pp. 2-24. J. B. Lippincott, Philadelphia, 1864.

[12] State of Ohio. *Sixteenth Annual Report of the Commissioner of Common Schools to the Governor of the State of Ohio for the School Year Ending August 31, 1869*, pp. 190-1. Columbus Printing Co., Columbus, 1870.

[13] State of Indiana. *Twenty-Fourth Report of the Superintendent of Public Instruction of the State of Indiana, 1875-76*, pp. 93-4.

also, in this report, the definite statement of a need for consideration of the future growth of population of the district as a factor in the accessibility of the site selected. While it is true that the State Superintendent of Ohio in 1854[14] advised school boards to "deliberate upon the expediency of redistricting their respective townships with a view to the formation of large and permanent districts," and that the State Superintendent of Minnesota in 1869[15] complimented the school board of Red Wing, Minnesota, for purchasing a site in an undeveloped section of the city to be used "when the growth of the city shall demand it," yet the consideration of probable growth in population was definitely stated only in the 1875-76 Indiana report and the 1881-82 Indiana report,[16] until some time after 1900 with the beginnings of the school building program surveys.

Raub, in his book *School Management*, published in 1882,[17] modified the requirement that sites be centrally located. He suggested that centrality was necessary only where the population was sparse; that "where the population is dense and the distance to be traveled not so great, any location may be selected that meets the requirements of health and comfort." It is possible that Raub's statement was inspired by a suggestion of Gardner in an 1876 issue of the *New England Journal of Education*[18] to the effect that it might be better to select a site in the encircling suburbs of a city where ample space was available than to select a cramped site in the center of the city. At any rate the idea was repeated with almost the definiteness of a principle in the 1891 report of the Pennsylvania State Board of Health,[19] and since that time has attained increasing importance in town and city site selection.

Since 1900 considerable changes have come about in the location of school sites for accessibility. Chief among these changes has been the adaptation of the site and its location to the particular type of school facilities provided for by the educational policy of the local school board. The community is looked upon as a living organization, and additions to school building facilities have been determined by a definite educational policy with the most accurate available population growth forecasts and definitely fixed maximum walking distances as the deciding factors in the accessibility of the school site. But today forecasting techniques are inadequate and require frequent rechecking; walking distances vary from one-half mile to two miles, depending upon the type

[14] State of Ohio. *Annual Report of the State Commissioner of Common Schools to the Governor of the State of Ohio for the Year 1854*, pp. 45-7.

[15] State of Minnesota. *Annual Report of the Superintendent of Public Instruction for the State of Minnesota for the Year Ending September 30, 1869*, p. 19. Press Printing Co., St. Paul, 1870.

[16] State of Indiana. "School buildings." *Thirtieth Report of the Superintendent of Public Instruction of the State of Indiana, 1881-82*, pp. 13-19. William B. Burford, Indianapolis, 1882.

[17] Raub, Albert N. *School Management*, pp. 14-15. E. L. Raub and Co., Philadelphia, 1882.

[18] Gardner, E. C. "School-house Architecture." *New England Journal of Education* 3:230, May 13, 1876.

[19] State of Pennsylvania. "School Hygiene." *Seventh Annual Report of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania, 1891*, p. 589. Circular No. 33, State Board of Health, Pennsylvania. Edwin K. Meyers, Harrisburg, 1892.

of school being provided for; and rural school consolidation has introduced the problem of transportation with its many undetermined standards. Much study remains to be completed before adequate standards on accessibility can be determined.

The *second* important consideration is that of the environment of the site. For the period previous to 1830 little need be said. Apparently no effort was made to secure the proper surroundings for school buildings. Communities considered themselves fortunate if they had a public school regardless of its environment. But with the coming of a consciousness of a need for greater educational facilities, educational leaders began to summarize the disagreeable features of the existing system, and pointed especially to the wretched environmental conditions of the schools. One such summary was published in 1831—a report of the condition of the common school system of Connecticut,[20] which cited the undesirableness of locating schools near stagnant marshes and ponds, prisons, and public roads with their unhealthful dust and immoral scenes.

A Massachusetts teachers' association in 1834[21] issued a report stating the principle of removal from immoral influences and introducing the element of landscaping. Mann,[22] in 1837, stated the principles of environment in negative terms, telling where a schoolhouse should not be located, and then summarized by saying that sites should be healthful, comfortable, and pleasing. Barnard,[23] in the following year, enumerated the same undesirable features and concluded that the site should be a quiet, pleasant, and healthful place; one which was safe and retired.

Potter and Emerson, in 1840,[24] requested a site selected according to the "laws of health" and the "dictates of taste." They expanded the principle of landscaping by suggesting natural rather than formal planting on the school grounds, and presented a long list of suitable trees, shrubs, and flowers for the purpose. One of the interesting ideas presented by Potter and Emerson, and repeated by a number of authors until as late as 1881, was the planting of a number of varieties of trees and plants to be used by the instructor as material for nature study.

The general condition of site environment and, at the same time, a negative statement of the principles accepted at the time are presented in the following quotation from Mayhew, State Superintendent of Michigan in 1847:[25]

"They are generally on one corner of public roads, and sometimes adjacent to a cooper's shop or between a blacksmith's shop and a saw mill. They are not unfrequently placed upon an acute angle, where a road forks, and sometimes in turning that angle the travel is chiefly behind the schoolhouse, leaving it on a small triangle, bounded on all sides by public roads. At other times the schoolhouse is situated on a low and worthless piece of ground, with a sluggish stream of water in its

[20] *Barnard's Journal of Education.* "History of Common Schools in Connecticut." *Barnard's Journal of Education* 5:143-4, June, 1858.

[21] Mann, *op. cit.*, p. 474.

[22] Mann, *op. cit.*, pp. 433-89.

[23] Brubacher, *op. cit.*, p. 223.

[24] Potter and Emerson, *op. cit.*, pp. 526-7.

[25] Barnard, *School Architecture*, pp. 39-43.

vicinity, which sometimes even passes under the schoolhouse. . . . Scholars very generally step from the schoolhouse directly into the highway. Indeed, schoolhouses are frequently one half in the highway, and the other half in the adjacent field, as though they were unfit for either. This is the case even in some of our principal villages. Schoolhouses are sometimes situated in the middle of the highway, a portion of the travel being on each side of them. When scholars are engaged in their recreations, they are exposed to the bleak winds and the inclemency of the weather one portion of the year, and the scorching rays of the meridian sun another portion."

In 1852, the State Superintendent of Indiana[26] introduced a new principle in the selection of school sites, that of so locating the site that there was an "agreeable prospect over the surrounding country." A number of later authors mention the same principle and then the topic drops from the literature.

The Indiana superintendent also warned against too much shade on the school grounds, and Burrowes, in 1855,[27] amplified the principle by stating that locations should be secured where full light is possible and where there are no outside impediments to its entrance such as low, dark positions or nearby buildings.

Wickersham's book, *School Economy*,[28] contained all the principles on school site environment developed before 1864 and added one new idea—that the lot selected should be free from obstacles and susceptible to a reasonable degree of ornamentation.

Very little information on prepared walks for school grounds was available until 1868 when Chase published a manual on schoolhouses and cottages for the people of the South.[29] Chase recommended gravel walks, gracefully curved and without sharp turns. Plank walks were offered as a more expensive substitute. Permanent walks could be constructed, according to Chase, by mixing plastering, sand, and boiled coal tar.

The need for enclosures for school lots, or rather the lack of enclosures, was first mentioned in the Rhode Island school report of 1845,[30] and various other authors after that date commented upon the advantages of having school sites properly enclosed. But Chase was the first one to describe in detail various types of fencing suitable for school grounds. Only two other authors after 1868 devoted any considerable attention to fencing the school lot. They were the State Superintendent of New Jersey in his 1874 report,[31] and Clark in *Rural School*

[26] State of Indiana. "School Houses." *First Annual Report of the Superintendent of Public Instruction for the State of Indiana to the General Assembly*, pp. 297-302. J. P. Chapman, Indianapolis, 1852.

[27] Burrowes, *op. cit.*, pp. 24-5.

[28] Wickersham, *op. cit.*, pp. 2-7.

[29] Chase, C. Thurston. *A Manual of School-Houses and Cottages for the People of the South*, pp. 64-5. Government Printing Office, Washington, D.C., 1868.

[30] Barnard, *School Architecture*, pp. 38-9

[31] State of New Jersey. *Report of the State Board of Education and the State Superintendent of Public Instruction for the School Year Ending August 31, 1874*, p. 85. William S. Sharp, Trenton, N.J., 1874.

Architecture, a circular of information published in 1880 by the United States Bureau of Education.[32]

The efforts to beautify school grounds did not escape criticism from educators and others, however, for in 1876 Gardner, writing a series of articles on school architecture in the *New England Journal of Education*,[33] pointed out rather vividly what must have become an all too common practice. He says:

"The front yard, which the scholars are not expected to enter for play, must be as large as possible, for here are the flower beds, the well-kept walks, the carefully trained trees of foreign birth, and, may be, a cast-iron vase—the whole a sort of foreground for the building, intended to make a fine show from the street—which is all well. But look around the corner, at the miserable remnant enclosed by tight board fences, divided again into two parts, ugly outbuildings in conspicious view, and not even the stump of a tree to relieve the desolation."

Continued effort was made, however, to make school grounds as attractive as possible, and in 1877 the Kansas State Historical Society adopted a resolution[34] requesting the introduction of a course in high schools and the State University on "planting and culture of shade and ornamental trees and shrubs on the schoolhouse grounds thruout the State." The Kansas State Teachers' Association in the same year recommended that county superintendents designate "Arbor Days" to encourage the planting of trees and the ornamentation of school grounds.

During the period from 1875 to 1900, there was an increasing amount of literature on landscaping, with a decided tendency toward natural planting of the school lot and against any hint at formal arrangement.

The principle of freedom from obstacles likely to interfere with free access of air and light had been stated by Burrowes in 1855. The school board of St. Louis in 1874[35] recognized the principle in adopting, as part of its school building policy, the resolution that "the school building should be so located that the windows, even on the lowest stories, should open to the light of the sky, and not to brick walls."

The Committee on Awards, in the competition for a model school building conducted in 1879 by the *Sanitary Engineer*,[36] recognized the principle by adopting the standard that "at least two adjoining sides of the building should be freely exposed to light and air, for which purpose they should not be less than 60 feet distant from any opposite building." Clark, in 1880,[37] stated that no tree should be allowed at less

[32] Clark, T. M. *Rural School Architecture*, pp. 14, 21-6. United States Bureau of Education, Circular of Information No. 4, Washington, D.C., 1880.

[33] Gardner, E. C. "School-House Architecture." *New England Journal of Education* 3:206-7, April 29, 1876.

[34] State of Kansas. *Report of the State Superintendent for the School Years Ending July 31, 1877, and 1878*, p. 46. George W. Martin, Topeka, 1879.

[35] City of St. Louis. "School Hygiene." *Twentieth Annual Report of the Board of Directors of the St. Louis Public Schools for the Year Ending August 1, 1874*, p. 116. Democrat Lithographing and Printing Co., St. Louis, 1875.

[36] *Barnard's Journal of Education*. "Sanitation and Education." *Barnard's Journal of Education* 25:ccxlvi-viii, 1876.

[37] Clark, *op. cit.*, pp. 14, 21-6.

distance than twice its own height from the house; and Lundy,[38] in the same year, said that schools "should be separate from all other buildings a distance equal to twice the height of the highest building in the vicinity." Later authorities approved and cited one or the other of the two standards. Among those advocating a distance of 60 feet were the Commission of Experts on School Buildings in the District of Columbia in 1882;[39] Newsholme in 1889;[40] and Burrage in 1899[41] while Philbrick in 1885[42] placed the minimum at 30 feet; Palliser in 1889[43] and the State Superintendent of Maine in 1896[44] recommended 50 feet; and Kaufman in 1896[45] thought 75 feet a proper distance. Among authorities recommending a distance equal to twice the height of surrounding objects were Young in 1891[46] and Lincoln in 1893.[47] Lincoln presented as a substitute standard "that the line drawn from the foot of the schoolhouse wall to the upper part of the other house should not form an angle with the horizon exceeding 30 degrees."

Rowe, in 1899,[48] introduced a new idea with respect to the relation of lighting in the school room and the environment of the building. He recommended that "areas and like passages contributing to the light of the building should be painted white, so as to reflect as much light as possible."

Rowe, in attempting to eliminate the factor of noise in the environment of the site, a topic for discussion in almost every article published since 1831 dealing with the site, suggested that the streets in the vicinity of the school be asphalted.

For the past thirty-five years there has been little change in the

[38] Lundy, C. J. "Light in the Public Schools, and School Life in Relation to Vision." *Eighth Annual Report of the Secretary of the State Board of Health of the State of Michigan for the Fiscal Year Ending September 30, 1880*, p. 28. W. S. George and Co., Lansing, 1881.

[39] Marble, Albert P. *Sanitary Conditions for Schoolhouses*, p. 36. United States Bureau of Education, Circular of Information No. 3, Washington, D.C., 1891.

[40] Newsholme, Arthur. *School Hygiene*, pp. 5-6. D. C. Heath and Co., Boston, 1889.

[41] Burrage, Severance and Bailey, Henry Turner. *School Sanitation and Decoration*, pp. 5-6. D. C. Heath and Co., Boston, 1899.

[42] Philbrick, John D. "School-Houses." *City School Systems in the United States*, p. 174. United States Bureau of Education, Circular of Information No. 1, Washington, D.C., 1885.

[43] Palliser, Palliser and Company. *Common Sense School Architecture*, p. 50. J. S. Ogilvie, New York, 1889.

[44] State of Maine. "School Yards and School Buildings, Designs, Plans, and Recommendations." *Report of the State Superintendent of Common Schools of the State of Maine for the School Year Ending June 1, 1896*, pp. 92-3. Burleigh and Flynt, Augusta, 1896.

[45] Kaufman, W. S. "School Architecture." *Report of the Superintendent of Public Instruction of the State of Indiana, 1895-96*, p. 495. William B. Burford, Indianapolis, 1896.

[46] Young, A. G. "School Hygiene and School-Houses." *Seventh Annual Report of the State Board of Health of the State of Maine, 1891*, pp. 267-9. Burleigh and Flynt, Augusta, 1892.

[47] Lincoln, D. F. "School Hygiene." *Twelfth Annual Report of the State Board of Health of the State of New Hampshire for the Fiscal Year, 1893*, p. 248. Edward N. Pearson, Concord, N.H., 1893.

[48] Rowe, Stuart H. *The Physical Nature of the Child*, pp. 147-8. The Macmillan Co., New York, 1899.

principles governing the environment of the school site. Of course there have been many refinements in the technique of landscaping, even to the point of the development of a highly specialized profession of landscape architects; the types of industries and establishments to be avoided in the selection of the site have changed with modern civilization; and city zoning ordinances have eliminated many undesirable factors in school surroundings. But the fact remains that practically all of the principles concerning the environment of the school site which are generally accepted today were well developed before 1900.

The *third* topic for consideration in a discussion of the school site is the drainage of the lot, a topic which includes the elevation of the lot, the nature of the soil, and the surfacing of the playground.

In all the literature on the subject published prior to 1854, there was no evidence that any attempts were made by school authorities to drain school sites, altho there must have been some surface drainage practices common. Many of the earlier references, however, indicated the desirability of locating the school site on dry, hard ground, and the need for avoidance of low, damp situations. Barnard, in describing the grounds suitable for Infant Schools in 1854,[49] introduced three new principles: that the playground should be graded, that it should be drained thoroly, and that it should be covered with "small binding gravel." Burrowes, in 1855,[50] advocated paving the playground with brick, and having the school lot slope gently to the south. Chase, in 1868,[51] in an extensive treatment on the drainage of the school site, mentioned artificial drainage for the first time, saying that drains running in the direction of the slope of the land should be laid every twenty to fifty feet, and that "drainage should be complete from every part of the grounds." Standards in grading were first mentioned in a description of the school site at Genesee Falls, New York,[52] in which it was stated that the lot was graded with a fall of one foot in twelve for a distance of twenty feet in all directions from the building.

The Cyclopaedia of Education, published in 1876 by Kiddle and Schem,[53] warned against "made" ground for school sites, and stated that "the soil should be, if possible, light or sandy, or a coarse gravel." Sometimes school authorities went to the extreme in selecting elevated sites, for Fairfield, in 1881,[54] tells of one Michigan town in which the school was located on an eminence higher than the tops of the church spires.

Hunt, in 1886,[55] touched upon a new phase of drainage when he

[49] Barnard, *School Architecture,* pp. 51, 54.

[50] Burrowes, *op. cit.,* pp. 237, 253-4.

[51] Chase, *op. cit.,* pp. 29, 65-6.

[52] *Barnard's Journal of Education.* "Plans of Schoolhouses with One-School Room." *Barnard's Journal of Education* 26:293-304, April, 1876.

[53] Kiddle, Henry and Schem, Alexander J. *The Cyclopaedia of Education,* pp. 438-9. E. Steiger, New York, 1877.

[54] Fairfield, M. W. "High Pressure vs. Hygiene in our Public Schools." *Proceedings and Addresses at the Sanitary Convention Held at Greenville, Michigan, April 11 and 12, 1882,* p. 200. W. S. George and Co., Lansing, 1883.

[55] Hunt, Ezra M. "The School and Its Appointments." *Principles of Hygiene for the School and the Home,* p. 290. Ivison, Blakeman and Co., New York, 1886.

recommended that "the water-level in the soil should never be higher than seven feet from the surface," and Newsholme, in 1889,[56] said that "the basement floor should be at least three feet above the highest level of the ground water." Newsholme also stated that "soil in which the ground-water is usually low, but liable to sudden variations in level, is less healthful than one in which the water is somewhat near the surface, but without great alternations."

Young, in 1891,[57] disagreed with earlier authorities in his statement that the "playground should never be paved nor covered with coarse gravel," and his objection to such surfacing was accepted by later authorities. Burrage, in 1899,[58] pointed out that a survey of all the adjoining country should be made in order to insure the selection of a site which could be perfectly and properly drained.

In recent years refinement in methods of grading and draining school grounds has been brought about with the development of the science of landscaping. Sandy loam soil, with a 15 to 25 per cent sand content, is considered standard for school grounds.[59] The most desirable type of playground surface has not yet been agreed upon by authorities in the field altho Milwaukee, and doubtless other large cities, have been experimenting with various combinations of surfacing materials for over ten years.[60] Continued effort toward the solution of the surfacing problem is one of the most challenging problems in connection with the school site.

The *fourth* and last of the topics to be considered in connection with the school site is that of its size and form. Early records show that there was no uniformity in the size or form of plots of ground used for school purposes.

The Essex County, Massachusetts, Teachers Association in 1833[61] set up the first definite standard with regard to size—an area of not less than one-fourth of an acre. Potter and Emerson, in 1840,[62] accepted the earlier standard but stated that if the school grounds were to be used as an aid in the study of nature at least one acre should be available. The State Superintendent of Public Instruction of Indiana, in 1852,[63] raised the minimum standard from one-fourth to one-half of an acre, and Burrowes, in 1855,[64] said that the rural school lot "should be a full acre in extent" and advised that "less than half an acre should not be accepted, even as a gift." Practically every author writing on the subject of rural school sites from 1855 to 1900 recommended a lot containing one

[56] Newsholme, *op. cit.*, pp. 3-5.

[57] Young, *op. cit.*, pp. 240-2.

[58] Burrage and Bailey, *op. cit.*, pp. 3-5.

[59] Strayer, George B. and Engelhardt, N. L. *Standards for Elementary School Buildings*, p. 9. Teachers College, Columbia University, New York City, 1923.

[60] Wiley, Guy E. "Report of Division No. 1, Sites and Grounds." *Proceedings of the Tenth Annual Meeting of the National Council on Schoolhouse Construction*, pp. 21-2. Milwaukee, 1932.

[61] Mann, *op. cit.*, p. 474.

[62] Potter and Emerson, *op. cit.*, p. 528.

[63] State of Indiana. "School Houses." *First Annual Report of the Superintendent of Public Instruction for the State of Indiana to the General Assembly*, p. 302.

[64] Burrowes, *op. cit.*, pp. 20-3, 27, 235.

acre. There were, of course, a few exceptions varying in requirement from two to fifteen acres.[65]

For city school lots, Barnard in 1854[66] stated that the minimum sized playground for 200 children should be 60 by 100 feet. The school board of St. Louis in 1874[67] adopted the policy of providing a minimum of 20,000 square feet for a school with 700 pupils. The *New England Journal of Education* in an 1880 editorial[68] stated that "the building should not occupy more than half the lot," and Philbrick, in a government publication in 1885,[69] said that the space devoted to a school should be twice as large as the school building, including contemplated future additions. The minimum of 30 square feet per child was looked upon as ideal by Snyder in 1896,[70] but he considered such an allotment impracticable in New York City.

Only one author, during the entire period previous to 1900, set up any definite standard as to the proper form for the school grounds. Wickersham, in 1864,[71] recommended a rectangular lot with the length three times the width where the area was from one-half to one acre in extent. With larger grounds, he said, the shape was not so important but even then the ground should form a compact body.

The era of rapidly growing cities brought with it the necessity for increasing school facilities. Additions to existing buildings were made. Soon the original site was completely covered with buildings. In many cases city development surrounded the school building with towering structures shutting out light and air. No playground remained. Such conditions resulted in a widespread movement to increase play facilities for city school children. Municipal playgrounds and parks were developed. The Playground and Recreation Association of America was organized. More adequate standards were evolved from extensive studies. Today, the school site must contain 100 square feet area per child, with a minimum area of 25,000 square feet exclusive of the areas covered by the building, walks, and landscaping.[72] High schools require additional space for the athletic field. There is a growing tendency to merge the municipal and school recreational centers, thus preventing duplication of effort and providing more adequate accommodations.

No history of school sites would be complete without giving a large amount of credit to those early pioneers who so materially assisted in the development of present-day principles and standards and who thru their persistent efforts made it possible for the children of today to have the advantages of playgrounds and school surroundings near at hand, beautiful in aspect, healthful, and ample in size.

[65] Wilmore, A. C. "Schoolhouses and School Grounds." *Indiana School Journal* 19:431, October, 1874.

[66] Barnard, *School Architecture*, p. 54.

[67] City of St. Louis. "School Hygiene." *Twentieth Annual Report of the Board of Directors of the St. Louis Public Schools for the Year Ending August 1, 1874*, p. 116.

[68] *New England Journal of Education*. "The Week." *New England Journal of Education* 11:184-5 March 18, 1880.

[69] Philbrick, *op. cit.*, p. 174.

[70] Snyder, C. B. J. "Annual Report of the Superintendent of School Buildings." *Fifty-Fifth Annual Report of the Board of Education of the City of New York, 1896*, p. 221. John Polhemus Printing Co., New York, 1897.

[71] Wickersham, *op. cit.*, pp. 3-7.

[72] Wiley, *op. cit.*, p. 20.

List of Bulletins in the Field of Education, Indiana University

The following is a list of the bulletins published by the School of Education, Indiana University.

All bulletins which are available at the present time may be secured for fifty cents ($.50) per copy, with the exception of the *Second Revision of the Bibliography of Educational Measurements;* the *Bibliography of School Buildings, Grounds and Equipment; The Philosophy of Human Relations—Individual and Collective,* and the *Bibliography of School Surveys and of References on School Surveys,* which may be secured for seventy-five cents ($.75) per copy. *The Philosophy of Human Relations —Individual and Collective* and all fifty-cent bulletins of the School of Education may be obtained from the University Bookstore. The other three bulletins should be ordered thru the Bureau of Coöperative Research, Indiana University.

Proceedings of the High School Principals' Conference (November 23 and 24, 1923). Vol. I, No. 1, 1924. 85 p. (Supply exhausted.)

Investigation of Nursing as a Professional Opportunity for Girls. Part I, Technical Study; Part II, Vocational Information Bulletin. By Florence E. Blazier. Vol. I, No. 2, 1924. 69 p.

Proceedings of the Eleventh Conference on Educational Measurements. Vol. I, No. 3, 1925. 141 p.

Proceedings of the High School Principals' Conference (November 14 and 15, 1924). Vol. I, No. 4, 1925. 49 p. (Supply exhausted.)

First Revision of the Bibliography of Educational Measurements. Compiled by the Bureau of Coöperative Research. Vol. I, No. 5, 1925. 147 p. (Supply exhausted.)

Proceedings of the Twelfth Conference on Educational Measurements. Vol. I, No. 6, 1925. 76 p.

The Effect of Population upon Ability to Support Education. By Harold F. Clark. Vol. II, No. 1, 1925. 28 p.

Proceedings of the High School Principals' Conference (November 20 and 21, 1925). Vol. II, No. 2, 1925. 77 p. (Supply exhausted.)

A Cross-Indexed Bibliography on School Budgets. By Harold F. Clark. Vol. II, No. 3, 1926. 66 p.

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Proceedings of the Thirteenth Annual Conference on Educational Measurements. Vol. II, No. 5, 1926. 103 p.

When to Issue School Bonds. By Harold Florian Clark and Paul Royalty. Vol. II, No. 6, 1926. 16 p.

Students' Attitude Toward Examinations. By Grover T. Somers. Vol. III, No. 1, 1926. 48 p.

Proceedings of the High School Principals' Conference (November 12 and 13, 1926). Vol. III, No. 2, 1926. 27 p.

Index Numbers in School Administration. By Harold F. Clark. Vol. III, No. 3, 1927. 35 p.

Topical Analysis of 224 School Surveys. Compiled by the Bureau of Coöperative Research. Vol. III, No. 4, 1927. 111 p. (Supply exhausted.)

Proceedings of the Fourth Annual Conference on Elementary Supervision. Vol. III, No. 5, 1927. 64 p.

Proceedings of the Fourteenth Annual Conference on Educational Measurements. Vol. III, No. 6, 1927. 66 p.

Some Phases of the Junior College Movement. By I. Owen Foster, Harold F. Clark, Willard W. Patty, and Leo M. Chamberlain. Vol. IV, No. 1, 1927. 125 p. (Supply exhausted.)

Second Revision of the Bibliography of Educational Measurements. By Henry Lester Smith and Wendell William Wright. Vol. IV, No. 2, 1927. 251 p.

Bibliography of School Buildings, Grounds, and Equipment. By Henry Lester Smith and Leo Martin Chamberlain. Vol. IV, No. 3, 1928. 326 p.

Proceedings of the High School Principals' Conference (November 18 and 19, 1927). Vol. IV, No. 4, 1928. 54 p.

The Economic Effects of Education. By Harold F. Clark. Vol. IV, No. 5, 1928. 39 p.

Proceedings of the Fifteenth Annual Conference on Educational Measurements. Vol. IV, No. 6, 1928. 73 p.

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Bibliography of School Buildings, Grounds, and Equipment—Part III. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. IX, No. 3, 1932. 130 p.